REPORT RESUMES

ED 018 672 VT 005 442

FINAL REPORT OF THE STUDY OF POST HIGH SCHOOL EDUCATIONAL NEEDS IN BUCKS COUNTY, 1968-1980. VOLUME I.
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PENNSYLVANIA UNIV., PHILADELPHIA, GOV.STUDIES CTR.
PENNSYLVANIA STATE DEPT. OF PUBLIC INSTRUCTION
PUB DATE MAR 68
EDRS PRICE MF-$1.00 HC-$10.36 257P.

DESCRIPTORS- *VOCATIONAL EDUCATION, *EDUCATIONAL NEEDS, ADULT EDUCATION, *POST SECONDARY EDUCATION, EDUCATIONAL OPPORTUNITIES, EMPLOYERS, *EMPLOYMENT OPPORTUNITIES, POPULATION TRENDS, ADULTS, HIGH SCHOOL STUDENTS, GRADE 12, EDUCATIONAL INTEREST, STUDENT ENROLLMENT, SURVEYS, BUCKS COUNTY, PENNSYLVANIA,

THE PURPOSE OF THE STUDY WAS TO DETERMINE THE PRESENT AND FUTURE OF LOCAL RESIDENTS FOR POST-HIGH SCHOOL EDUCATION, THE ABILITY OF EXISTING FACILITIES TO MEET THE NEEDS, FACTORS WHICH RESTRICT THE EDUCATIONAL OPPORTUNITIES, AND COURSES OF ACTION FOR MEETING LOCAL EDUCATIONAL NEEDS. HIGH SCHOOL SENIORS, ADULTS, MAJOR EMPLOYERS IN BUCKS COUNTY, AND POST-HIGH SCHOOL INSTITUTIONS IN THE COUNTY AND SURROUNDING COMMUNITY AREA WERE SURVEYED BY QUESTIONNAIRES UNDER THE DIRECTION OF A 27-MEMBER ADVISORY COUNCIL REPRESENTING EDUCATION, BUSINESS, LABOR, AND GOVERNMENT. RECOMMENDATIONS ARE PRESENTED FOR THE DIFFERENT LEVELS AND TYPES OF EDUCATIONAL INSTITUTIONS, EMPLOYERS, AND THE ENTIRE COMMUNITY. SOME RECOMMENDATIONS CONCERNED--(1) INCREASING EVENING PROGRAM ENROLLMENT CAPACITY IN AREA VOCATIONAL-TECHNICAL SCHOOLS FROM 1,200 IN 1966-67 TO 3,300 BY 1980 AND EXPLORING THE POSSIBILITY OF 13TH AND 14TH YEAR PROGRAMS, (2) INCREASING ADULT AND CONTINUING EDUCATION EVENING PROGRAM ENROLLMENT CAPACITY IN HIGH SCHOOLS FROM 3,600 IN 1966-67 TO 10,200 BY 1980 AND STRESSING JOB-RELATED OFFERINGS, (3) IN COMMUNITY COLLEGES, EXPANDING THE ENROLLMENT CAPACITY AND EXPLORING THE POSSIBILITY OF EXPANDING PROGRAM OFFERINGS IN AREAS OF PREREGISTERED NURSING, PRACTICAL NURSING, AND MEDICAL TECHNOLOGY IN COOPERATION WITH HOSPITALS, (4) EXPANDING TUITION ASSISTANCE AND OTHER INCENTIVES BY EMPLOYERS TO EMPLOYEES ENGAGING IN POST-HIGH SCHOOL EDUCATION, (5) CONDUCTING A COMPREHENSIVE STUDY OF POST-SECONDARY EDUCATION NEEDS AND RESOURCES WHEN THE 1970 U.S. CENSUS DATA BECOME AVAILABLE, AND (6) MAKING THE STATE LEGISLATURE AND THE HIGHER EDUCATION ASSISTANCE AGENCY AWARE OF COMMUNITY SUPPORT FOR SCHOLARSHIP FUNDS FOR STUDENTS PURSUING POST-HIGH SCHOOL EDUCATION IN INSTITUTIONS NOT GRANTING COLLEGE DEGREES. APPENDIX A AND B LIST WORKING PAPERS ON POPULATION GROWTH, EMPLOYMENT, AND EDUCATION IN BUCKS COUNTY, PENNSYLVANIA. APPENDIX C THROUGH G AND THE BIBLIOGRAPHY ARE IN VOLUME II (VT 005 443). A PROGRESS REPORT OF THE STUDY IS VT 002 737. (BS)

ED0186672

FINAL REPORT

A STUDY OF POST HIGH SCHOOL EDUCATION NEEDS IN BUCKS COUNTY 1968-1980

VOL. I

VT005442

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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FINAL REPORT OF THE STUDY OF POST HIGH SCHOOL EDUCATIONS NEEDS IN BUCKS COUNTY
1968 - 1980

Jointly Submitted By

Bucks County Superintendent of Schools Office and The Govenment Studies Center of the Fels Institute of Local and State Government, University of Pennsylvania

In Cooperation With

The Bureau of Vocational, Technical and Continuing Education, Department of Public Instruction

To

The Bucks County Council of Post High School Education Needs

March 1968

County Administration Building
Doylestown, Pennsylvania

COUNCIL MEMBERS

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Joseph O. Canby	Commissioner	Bucks County Commissioners
George M. Chewning	Member	Morrisville Boro School Board
Alvah L. Clarance	Member	Central Bucks School Board
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David Jones	Member	Bucks County Guidance Counselors Association
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Name	Title	Organization
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George M. Schaffer	Principal	Lower Bucks County Vocational-Technical School
Fred J. Stackpole	Member	Centennial School Board
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W. Donald Vaughan	Director of Learning & Pupil Personnel Service	Centennial School District

Ex Officio Members

Sidney W. Popkin	President	Bucks County Board of School Directors
George E. Raab	Superintendent	Bucks County Public Schools

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John K. Parker	Director	Government Studies Center, Fels Institute
Joseph S. Tezza		Bucks County Superintendent of Schools Office
Melvin G. Mack		
Boyd Z. Palmer		Government Studies Center, Fels Institute
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Director, In-Service Education Services

ADMINISTRATION BUILDING
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348-2940

GEORGE E. RAAB
SUPERINTENDENT

JOSEPH S. TEZZA
Coordinator, Special Pupil Services
RUDOLPH P. MATYAS
Supervisor of Special Education

February 29, 1968

Mr. Sidney W. Popkin, President
Bucks County Board of School Directors
County Administration Building
Doylestown, Pennsylvania 18901

Dear Mr. Popkin:

This letter accompanies the second and final draft of the "Study of Post High School Education Needs in Bucks County from 1968 through 1980." The report contains: (1) summary of conclusions and recommendations; (2) description of study activities; (3) discussion of population growth in Bucks County; (4) employment and education in and around Bucks County; (5) post high school education resources serving the citizens of the county; (6) post high school education prospects of high school seniors and adults; and (7) the seven working papers produced by the study team. Chapter I contains a brief resume of the conclusions and recommendations. Each recommendation is developed in detail in Chapter VIII and is supported by relevant data.

The conclusions and recommendations of this report, as well as all supporting information, was accepted unanimously by the Post High School Study Council at its last meeting on Tuesday, February 27. I have been asked by the Council to present the results of this study to the County Board at its regular monthly meeting on Tuesday, March 19. The Council would like to meet with you and the Board at a dinner meeting at the Warrington Inn on Tuesday, April 16, at 6:30 p.m. The Council wishes to discuss the conclusions and recommendations with the Board and explore ways of implementing these recommendations.

The close interaction of the Council and the Study Staff has produced results of exceptional value. The results can be used by agencies and organizations in the county when they consider what action they will take to meet the needs of Bucks County residents for post high school education.

Sincerely yours,

James F. Smith

James F. Smith
Council Chairman

JFS:car

PREFACE

The United States has developed one of the most advanced systems of public education in the world. Although the national government, state governments, and private institutions have played important parts in the development of public education in the United States, it has been local communities which have been mainly responsible for the continuing action which has built the foundation of our system of public education--comprehensive education from kindergarten through high school.

In the past, education beyond high school--whether for recent graduates or more mature adults--often has been considered to be beyond the range of the educational concerns of local communities. Today, in our complex and rapidly changing society, education beyond high school is becoming an important concern of all local communities. Education beyond high school is seen to be a key factor in both personal development and economic advancement, and education increasingly is viewed as a process continuing throughout life.

Progressive local communities such as Bucks County, Pennsylvania, have initiated extensive evening education programs in the public schools to serve the needs of those residents seeking to complete high school education, to acquire new or expanded job-related skills and knowledge, and to develop their personal abilities and potentials as individuals and as members of the community. Bucks County and other communities have also taken action to establish community colleges to ensure that opportunities at the level of college programs are extended to community residents.

Bucks County has not been alone in its action to meet increasing community needs for education beyond high school through such vital measures as evening programs in the public schools and establishment of a community college. But Bucks County may be the first local community to broaden its vision to view the entire field of post high school education and ask, "What are the needs of members of our community for all types of post high school education programs, and what can our community do to expand opportunities for our residents?"

This report is the result of an intensive effort to provide an initial answer to that significant question. The conclusions and recommendations contained in this report represent an initial answer for two reasons. First, Bucks County, even more than most communities, is growing and changing rapidly, and thus the meaning of the question and its answers are not fixed, but must change as the community changes. Hence, there is need for continuing review of the changing needs of the community and of educational programs available to meet the needs. Second, viewing the complete range of post high school education opportunities from the perspective of the needs of a local community is itself a new approach, which has required development of new methods of research and analysis. These methods, and the information required, can be expected to be improved in the future as other communities and research organizations begin to devote their attention to comprehensive planning for post high school education at the local level.

The recommendations contained in this report, when put into action, will provide new and improved educational opportunities for tens of thousands of Bucks County residents. Many people have combined their efforts toward this single result, including hundreds of employers and educational institutions, and thousands of Bucks County residents who participated in surveys and interviews. To all of these, and to those individuals and organizations whose major contributions are mentioned specifically in this report, we express our most sincere thanks for their cooperation, dedication and perseverance.

C. E. Brewin, Jr.
C. E. Brewin, Jr.

John K. Parker
John K. Parker

March 12, 1968

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[illegible] . . . . [illegible]

FIGURE 5

[illegible] . . . . [illegible]

FIGURE 6

[illegible] . . . . [illegible]

FIGURE 7

[illegible] . . . . [illegible]

FIGURE 8

[illegible] . . . . [illegible]

FIGURE 9

[illegible] . . . . [illegible]

FIGURE 10

[illegible] . . . . [illegible]

FIGURE 11

[illegible] . . . . [illegible]

CHAPTER I

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The population of Bucks County is growing rapidly: the numbers of graduating high school seniors and adults are increasing even more rapidly than total population growth. Educational levels in all occupations are rising, and there is a steady increase in the national rate at which high school seniors go on to post high school education.

Bucks County residents are fortunate in that their County is one of the few in the Commonwealth to have established a Community College and area vocational-technical schools. These institutions and the public high schools offer a variety of post high school education opportunities, and are planning substantial increases in the future. Two universities offer courses at several locations in the County for evening students, and there is one four-year college in the County. There are many institutions offering post high school education programs within a commuting distance of about 45 minutes driving time.

Even so, there are large and growing numbers of Bucks County residents who are endeavoring to obtain post high school education whose needs are not being met. The proportion of graduating high school seniors in Bucks County who go on to college is below the national average. Relatively few graduating seniors enter non-degree post high school education programs directly following graduation. Adults encounter even greater difficulties in obtaining post high school education.

The following Chapters explore the patterns of post high school education needs, both those that are being met and those which go unmet. Chapter VIII presents these unmet needs in perspective and proposes action to reduce or eliminate unmet needs and to generally increase post high school education opportunities for County residents through 1980.

Recommendations for Public School Districts

(These recommendations are summarized briefly below. The numbers in parentheses refer to the full recommendation presented in Chapter VIII, and to the page number on which the recommendation appears.)

--Increase enrollment capacity in evening programs of area vocational-technical schools from the 1966-67 level of at least 1,200 to about 3,300 by 1980. Explore possibility of 13th and 14th year programs. (1. - page 103)

--Increase enrollment capacity in adult and continuing education evening programs in high schools from the 1966-67 level of at least 3,600 to about 10,200 by 1980. Stress job-related offerings. (1. - page 103)

--School districts not now offering evening post high school education programs give serious attention to such offerings. (2. - page 104)

--High school counseling programs stress actual employment opportunities and educational requirements, emphasizing post high school education other than college where appropriate. (12. - page 127)

--Make high school counseling programs available to adults to the greatest extent possible. (12. - page 127)

Recommendations for the Community College

--Increase non-transfer, first year enrollment capacity from the 1966-67 level of about 246 to at least 1,100 by 1980. (3. - page 104)

--Increase two-year degree and transfer, first year enrollment capacity from the 1966-67 level of about 830 to about 2,300 by 1980. (4. - page 111)

--Explore the possibility of expanding program offerings in areas of pre-registered nursing, practical nursing and medical technology in cooperation with hospitals. (5. - page 111)

--If other courses of action for meeting four-year degree program needs are unsuccessful, plan to increase first year, degree credit enrollment by an additional 2,400 day enrollments and 1,700 evening enrollments by 1980. Consider an additional campus if this expansion is necessary. (11 - page 124)

Recommendations for Delaware Valley College of Science and Agriculture

--Consider major expansion in liberal arts, teacher education, engineering and business day programs for commuters, on the order of 1,200 first-year enrollments in 1980 above current plans. Consider additional 800 evening students by 1980 and means of reducing tuition. (7. - page 122)

Recommendations for Temple University and Pennsylvania State University

--Expand teacher education offerings at continuing education centers in evenings, consider additional locations. (6. - page 122)

--Consider possibility of establishing branches in Lower Bucks area offering the full range of university programs, with first year enrollments on the order of 1,200 in the day and about 800 in the evening by 1980. (8. - page 123)

Recommendations for Employers

--Consider expanding tuition assistance and other incentives to employees who engage in post high school education.

Increase information made available to employees about post high school education opportunities and company incentives. (14. - page 128)

--Work more closely with institutions offering post high school education both in sponsorship of programs and in employment for those completing programs. (15. - page 129)

Recommendations for the County Board of School Directors

--Consider establishing continuing Advisory Council on Post High School Education to aid in community cooperation. (16. - page 129)

--Consider appointing Post High School Education Coordinator in County Superintendent's office to work with Council, assist in action programs of institutions, and provide information about needs and opportunities. (16. - page 129)

--Plan to conduct similar post high school education study after 1970 Census, but cooperatively on a metropolitan regional basis if possible. (17. - page 130)

Recommendations for the Entire Community

--Make members of the State Legislature and the Higher Education Assistance Agency aware of support for scholarship funds for students pursuing post high school education in

Increase information made available to employees about post high school education opportunities and company incentives. (14. - page 128)

--Work more closely with institutions offering post high school education both in sponsorship of programs and in employment for those completing programs. (15. - page 129)

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--Consider establishing continuing Advisory Council on Post High School Education to aid in community cooperation. (16. - page 129)

--Consider appointing Post High School Education Coordinator in County Superintendent's office to work with Council, assist in action programs of institutions, and provide information about needs and opportunities. (16. - page 129)

--Plan to conduct similar post high school education study after 1970 Census, but cooperatively on a metropolitan regional basis if possible. (17. - page 130)

Recommendations for the Entire Community

--Make members of the State Legislature and the Higher Education Assistance Agency aware of support for scholarship funds for students pursuing post high school education in institutions which do not grant college degrees. (13. - page 128)

--Endeavor, over the long term, to bring about a complete university, including graduate programs, in Bucks County. (9. - page 123)

--Explore possibility of providing a site and facilities at which one or more colleges or universities could conduct full programs, with possibility of cooperative action by business and industry, County schools, County governments and private individuals to meet costs. (10 - page 123)

CHAPTER II

INTRODUCTION

Developments Prior to Undertaking The Study

The Bucks County Superintendent of Schools Office undertook a feasibility study to determine whether or not a community college should be established in Bucks County. A preliminary proposal for a Bucks County Community College was submitted to the Spring Convention of the Bucks County School Directors held in the Franklin D. Roosevelt Junior High School, Bristol Township on May 27, 1964. This proposal was reviewed and accepted by a majority of the Bucks County School Directors at this convention. The following resolution was passed:

> RESOLVED: That the Bucks County Convention of School Directors endorses the immediate need for the establishment of a Bucks County Community College; that sponsorship be sought at once from the Bucks County Commissioners in

> accordance with the provisions of Act 484; and that the enclosed recommendations be taken into account by the Board of Trustees of the Bucks County Community College.

In a special action at the same convention the following motion was also passed:

> In view of the urgent and continuing need for higher education facilities and services, in addition to the establishment of a community college as above provided, that this County Convention endorses the establishment of college or university extension centers to serve the residents of Bucks County, and directs the County Board to assist in whatever way it can for such provisions.

Dr. Louis Bender, Assistant Bucks County Superintendent of Schools, at the direction of Dr. George E. Raab, Bucks County Superintendent of Schools, developed plans for exploring the possibility of establishing a college or university extension center in the county. These plans included: (1) examination and development of a record file on higher education; (2) scholarships and loan possibilities; (3) follow-up studies of high school students; (4) development of channels of information concerning higher education for students, parents and the public-at-large; and (5) exploration of the possibility of establishing an extension center involving one or more institutions of higher learning.

A number of institutions of higher learning were contacted by Dr. Bender during the first six month of 1965. Several institutions indicated that they would be pleased to explore the possibility of a multi-institution extension center to be located within the county. Before a meeting of these institutions could be called, Dr. Bender left the county office to assume the position of Director of the Bureau of Community Colleges, Department of Public Instruction.

Dr. C. E. Brewin was hired to replace Dr. Bender and assumed his duties on September 1, 1965. Dr. Brewin was directed by Dr. Raab to ask those institutions of higher learning interested in an extension center to attend a special meeting at the Bucks County Community College on November 10, 1965. The possibility of establishing a multi-institution extension center with these institutions was explored. The following institutions sent representatives to the meeting: Lafayette College, Lehigh University, Lincoln University, Millersville State College and Pennsylvania State University, Temple University, Ursinus College, Villanova University, West Chester State College and Bucks County Community College. The concensus of the group was that the development of an extension center involving one or more institutions of higher learning could not be profitably explored until a thorough study of the higher education needs of the county was undertaken.

Establishment of the Council

The above recommendation was referred to the Bucks County Board of School Directors at their January 18, 1966 meeting. The Bucks County Superintendent of Schools asked the board to reactivate the Bucks County Council on Higher Education for the purpose of exploring the possibility of a study of the higher education needs of the citizens of the county.

Mr. James F. Smith, former president of the Pennsbury Board of School Directors, was asked to serve as chairman of the council. Each of the 13 local school districts, Bucks County Community College and Delaware Valley College was asked to appoint a representative to the council.

The first meeting of the council was held on March 30, 1966. The discussions of the council members ranged across the entire spectrum of post high school education needs of the county. The council directed the county office to develop a proposal for undertaking the study and requested that the proposal be submitted to the council by June, 1966. Because the interest of the council covered the entire spectrum of post high school education it appeared wise to expand the council's membership to include representatives from the two vocational-technical schools, non-public schools, county government, business and labor. The council was expanded to its present membership by June of 1966. The title of Bucks County Council on

Higher Education was changed to Bucks County Council of Post High School Education in September, 1966. The former title did not reflect the concerns of the council or the scope of the study.

The Government Studies Center of Fels Institute of Local and State Government, University of Pennsylvania, was asked by the county office to prepare a proposal for the study. Because of the complexity of the problem it was deemed wise to provide the council with an objective means of attacking the problem. An operations analysis strategy was selected for undertaking the study because of the nature of the problem and the difficulty of arriving at alternative solutions or corrective actions.

Mr. Parker of the Government Studies Center, and Dr. Brewin presented the proposal for undertaking the study at the June 15, 1966 meeting of the council. The proposal outlined the scope, objectives and three phases of the study. Phase I dealt with the development of the study design. During the time required for this phase: (1) the scope and objectives of the study were to be defined; (2) research questions formulated; (3) methodology developed; (4) work program for Phases II and III outlined; (5) budget and time estimates for the work program developed in detail; and (6) the personnel requirements outlined and their responsibilities defined. Phase II of the study was to be concerned with: (1) conducting the various surveys required to gather the data; (2) developing the computer model; and (3) reduction and analysis of data. Phase III was to be devoted to: (1) determining the priorities of the various needs identified in

Phase II; (2) alternative corrective action plans; (3) developing the "best" corrective action plan; and (4) possible financial cost of the plan. It was projected that the final plan would be submitted to the Bucks County Board of School Directors at one of their regular monthly meetings in the late winter or early spring of 1968.

Funding of the Study

The Government Consulting Service's proposal was tentatively approved by the council pending funding of the study. The estimated cost of the study was $50,000. Dr. Brewin was asked to investigate the possibility of securing funds from private, state and federal sources.

Twenty businesses and industries and one union council were contacted for financial support of the study during the next eight months. A total of $4,700 was received from these sources. The following business and industries contributed:

Badenhausen Corporation
Cornwell Heights, Pennsylvania

Bristol Printing Company
8400 Route 13
Levittown, Pennsylvania

Eastern Rotorcraft Corporation
Doylestown, Pennsylvania

Fischer and Porter
County Line Road
Warminster, Pennsylvania

Minnesota Mining and Manufacturing Company
Bristol, Pennsylvania

Paterson Parchment Paper Company
Bristol, Pennsylvania

Pennsalt Chemical Corporation
Equipment Division
995 Mearns Road
Warminster, Pennsylvania

Rohm and Haas
Box 219
Bristol, Pennsylvania

Sylvan Pools, Incorporated
Route 611
Doylestown, Pennsylvania

Thiokol Chemical Corporation
Newportville and Emily Roads
Bristol, Pennsylvania

Six private philanthropic foundations were contacted, none of which indicated that they were in a position to underwrite the cost of the study.

Dr. John Struck, Head of the Bureau of Vocational-Technical and Continuing Education, Department of Public Instruction, was approached and indicated that the bureau was willing to underwrite the cost of Phase I. The cost of Phases II and III would be supported by Dr. Struck's Bureau if the results of Phase I justified continued support.

Objectives of the Study

The general objectives of the study were to assist the council in:

1. Estimating the present and future needs of the residents of Bucks County for post high school education.

2. Estimating the ability of post high school resources now serving county residents to meet anticipated future needs for post high school education.

3. Determining which factors restrict the opportunities of county residents in obtaining needed post high school education.

4. Identifying courses of action available to the county to overcome future deficiencies in post high school education resources as compared with estimated needs.

The courses of action developed could include some if not all of the following points:

a. Development of various cooperative arrangements among the Community College, Delaware Valley College, vocational-technical schools, comprehensive high schools, extension centers and other institutions outside the county.

b. Establishment of at least one more community college.

c. Establishment of thirteenth and fourteenth year vocational-technical programs based on the existing vocational-technical high schools.

d. Development of various retraining and adult education programs to be offered at existing institutions within and outside the county.

e. Development of new curricula to be offered at existing institutions within and outside the county.

f. Commitments of institutions outside the county to a fixed or increasing rate of enrollment of students in Bucks County.

Scope of the Study

In addition to the general objectives, the following statement of the scope of the study was used to prepare detailed research questions which then determined the content of the study more specifically.

1. Present and future post high school education needs of county residents will be examined for both graduating high school students and for the adult population as a whole. Within the adult population, attention will be given to those who have not completed high school as well as those who are high school graduates.
2. Employment practices and education requirements, and unmet employee education needs within Bucks County will be ascertained from major employers and labor organizations in Bucks County.
3. Present and future employment opportunities by occupational groups will be determined for Bucks County and for the three primary employment centers most accessible to Bucks County residents: Philadelphia-Camden Standard Metropolitan Statistical Area (SMSA), Trenton SMSA, and Allentown-Bethlehem SMSA.
4. Post high school educational resources receiving primary attention will be those within Bucks County and those within daily commuting distance of population centers in Bucks County.

All educational resources beyond daily commuting distance of residents of Bucks County will be treated by general category and receive secondary emphasis. Actual patterns of utilization and relevance to established needs of Bucks County residents will determine the relative intensity of study of educational resources in both categories.

5. In examination of educational resources, the emphasis will be on the capacity of the resources to meet needs of Bucks County residents and will not extend to an evaluation of individual institutions and programs.
6. Greatest emphasis will be placed on present unmet needs that are expected to increase through 1980; secondary emphasis on present unmet needs expected to decrease through 1980; minimum emphasis on needs currently satisfied but estimated to become larger than available resources by 1980.
7. Examination of courses of action will give greatest emphasis to public institutions and programs now within, or potentially within, Bucks County.

General Methodology and Progress in Each Phase

This study began with an intensive analysis on a broad front of the present and future needs for post high school education of the residents of Bucks County. This approach is somewhat unique, for many prior studies both in the county and in the commonwealth as a whole have approached post high school education needs on a narrow front, i.e., they have generally been concerned with a specific programmatic or organizational objective.

The approach taken in the conduct of the study is also noteworthy for the major contribution made by the council. The individual members of the council were deeply involved in the decision process, leading to development by the council of a series of recommendations. These recommendations were based on the content of the base line study and the major alternatives revealed in the study. The close interaction of the council and the study staff has produced results of exeptional value to various agencies and organizations within Bucks County. These results of the study can be used by these agencies and organizations when they consider what action they shall take to meet the needs of county residents for post high school education.

Phase I: Study Design

There are three major phases in this study. The first is the design phase. The objectives of this phase were:

1. Development of a series of detailed questions to be answered in achieving the general objectives of the study. The research questions can be found in the Phase I Progress Report and the working papers in the Appendix.

2. Identification and evaluation of available data, reports, predictions and plans of potential value in carrying out the study. Refer to the Bibliography for this information.

3. Determination of requirements for collection of additional data and for special surveys. These data collection methods can be found in the *Phase I Progress Report*.

4. Development of a methodology for estimating unmet needs for a particular educational program in a specific geographic area. This information can be found in the *Phase I Progress Report*.

5. Development of a work program and schedule. The detailed work program and schedule is shown in the *Phase I Progress Report*.

The November 9, 1966, council meeting was devoted to a review and adoption of the work program for Phase I and a thorough discussion of the general objectives and scope of the study. Following the meeting the general objectives and scope paper was modified in accordance with the recommendations of the council. The council further recommended that the Bucks County Board of School Directors enter into an agreement with the Government Studies Center of the Fels Institute of Local and State Government, University of Pennsylvania, at its regular monthly meeting on November 15, 1966. The agreement stipulates that the Bucks County Board of School Directors and the Government Studies Center will make arrangements to engage in Phases II and III of the study pending satisfactory completion of Phase I.

The council met again on November 30, 1966 and reviewed the amended general objectives and scope paper and devoted the balance of the meeting to a thorough discussion of the preliminary research questions. The preliminary research questions were amended during December in accordance with the recommendations of the council. The revised research questions were sent to all council members in early January, along with the suggested methodology.

The January 26, 1967 council meeting was devoted to a thorough examination of the methodology. The methodology was divided into two separate but related sections. The first section described the simulation model that would be constructed to assist in performing the complex analyses involved in estimating the high priority unmet needs. The main function of the model would be to extend the estimates of unmet needs through time to 1980 and test the impact of various alternative plans of action designed to satisfy as many high priority needs as possible.

The second section of the methodology described methods to be employed in collecting data to answer the research questions and to provide input into the simulation model. Six surveys were suggested in addition to the collection, comparison and analysis of other data through statistical methods and the judgment of the study staff, consultants and council.

The methodology was modified following the January 26, 1967, meeting of the council. A detailed work program, revised budget and work program network for Phases II and III were discussed at the February 14, 1967, meeting of the council. During this discussion the council was informed that Dr. Struck agreed to continue support of the study for Phases II and III at the level of $51,500. This agreement was reached at a meeting in Harrisburg on February 9, 1967, with Dr. Struck. The council approved the work program and the revised budget.

A final report on Phase I was presented to the council at the March 1, 1967, meeting. Mr. Smith, council chairman, presented the report to the Bucks County Board of School Directors at their regular monthly meeting on March 21, 1967. At the conclusion of Mr. Smith's presentation the board entered into an agreement with the Government Studies Center for the completion of Phases II and III of the study for a sum of $45,900. The balance of the $51,500 was used by the board to pay the census enumerators and guidance councilors for the collection of data.

Phase II: Data Gathering and Analysis

The objective of the phase was to carry out the work program developed during the first phase. At the conclusion of this phase it was intended that the study staff would prepare a preliminary report containing all factual analyses. However, because of technical difficulties it was decided that a series of working papers would be presented to the council following the analysis of the data from each survey. These papers are contained in the Appendix.

The questionnaires, covering letters and information pamphlet were developed during the month of March. The various public, private and parochial high schools were contacted and arrangements were made to administer the High School Senior Questionnaire and gather data concerning the high school senior's most recent I.Q. and his class standing by decile.

The April 5 council meeting was devoted to a review and modification of the questionnaires. Following the council meeting the questionnaires were printed and disseminated in accordance with the survey schedule. Guidance counselors and school census enumerators were trained in the use of the questionnaires and data gathering forms. The high school senior survey was completed by the end of April.

During the month of May the completed high school senior questionnaires were processed by the county office and were keypunched. The school census enumerators began gathering data on the adult survey. Several clerks, who were trained in the adult data gathering procedures, were sent into the field to check on the progress of the census enumerators and to correct any problems that they encountered. The High School Senior Record Data Questionnaire was sent to the guidance counselors.

The activities during the month of June revolved around the adult survey and the high school senior record data survey. The Government Service Center analyzed the data from the High School Senior Questionnaire and completed the construction of the computer models. The council held a meeting on June 7 to discuss the progress on the various surveys. The High School Senior Follow-Up Questionnaire was presented to the council and several changes were recommended in this questionnaire. The council approved the questionnaire for dissemination during the month of August and recommended that each questionnaire be accompanied by a note from the head guidance counselor of the high school the senior attended. It was felt that this communication from the counselor would induce the senior to return the questionnaire to the county office.

The Adult Survey was completed in July. The analysis of the data from the High School Senior Questionnaire Survey and the High School Senior Record Data Survey was also completed during July. The questionnaires for the follow-up survey, covering letters and guidance counselor's notes were printed and assembled for distribution in August.

The remainder of the questionnaires from the adult survey were keypunched during the month of August. The mailing for the follow-up survey was completed during this month. The following working papers were sent to the council members: Working Paper No. 1, Estimates of Future Population Growth by School District, Bucks County, Pennsylvania; Working Paper No. 2, Employment and Education in Bucks County, Pennsylvania; and Working Paper No. 3, Post High School Educational Resources In and Around Bucks County, Pennsylvania.

The council held a meeting on September 7 and discussed Working Paper Numbers 1, 2 and 3. The council also received a general status report on the various surveys undertaken by the study team. Some of the tasks that were projected for completion at the end of Phase II were carried forward into Phase III. Phase II began March 1, 1967, and was scheduled for completion on October 31, 1967.

Phase III: Conclusions and Recommendations

The objective of the final phase of the study was to apply the judgmental values of the council to the factual results obtained in Phase II and set forth in the working papers. The study staff defined major alternatives and identified principle advantages and disadvantages of each, for the purpose of aiding the council in its deliberations.

At the October 27 meeting of the council, Working Paper No. 4, Characteristics of High School Seniors, Bucks County, Pennsylvania, was presented. During this meeting the council established a set of priorities based on an examination of the data from the high school senior survey. These priorities were employed by the study team in the development of the material to be presented to the council at the November 29 meeting.

The council reviewed the unmet needs as identified by the surveys and discussed possible alternative courses of action at the November Meeting. A set of preferred courses of action were developed by the council. The results of this meeting guided the study team in its preparation of the final set of conclusions and recommendations to be presented to the council at the February 27 meeting.

All of Phase II's work program was completed by the middle of February. The surveys of high school seniors, adults, major employers in Bucks County and post high school institutions in the county and surrounding commuting area were completed. The results were analyzed and incorporated in the working papers covering each of the surveys. In addition an analysis and projection of the population in Bucks County was prepared in the form of a working paper.

Design, development, programming and operation of computer models to forecast educational resources and educational needs of Bucks County residents and to estimate unmet needs were completed. The results of the surveys and of the estimates of unmet needs were provided to the council.

The council meeting on February 27 was devoted to a discussion of the final set of conclusions and recommendations. The recommendations were amended in accordance with the council's wishes. Four-hundred copies of the final report were produced for dissemination. The council made a formal presentation of the conclusions and recommendations to the Bucks County Board of School Directors at their regular monthly meeting on March 19, at the County Administration Building on the seventh floor in the conference room. A summary report outlining the scope, objectives, methodology, conclusions and recommendations will be prepared for dissemination during the month of April.

Phase III, including preparation of the final report, was scheduled to take place from November 1, 1967, through March 31, 1968. This is an extension of the original time period by two months.

The collaborative effort between the council and the study staff has resulted in a final report that spells out a set of recommendations that are directly aimed at satisfying the post high school education needs of the citizens of Bucks County from 1968 through 1980. A periodic updating procedure, which utilizes the computer models and computer tapes of survey data, has been developed to insure that future plans can be adapted to fit the ever-changing socio-economic conditions of Bucks County and the Greater Philadelphia Metropolitan Region in which it is imbedded.

CHAPTER III

FUTURE POPULATION GROWTH IN BUCKS COUNTY

Bucks County is a major part of the Philadelphia metropolitan area. Bounded on the east and north by the Delaware River, the County's southeastern corner borders on the City of Philadelphia, while its northwestern limit extends nearly to Bethlehem and Allentown. Trenton, New Jersey lies immediately across the Delaware.

Situated in the heart of "Megalopolis", on the axis between Philadelphia and New York, Bucks County is experiencing rapid development and urbanization. In less populated parts of the United States, the County would be regarded as a metropolitan area in itself. Its 635 square miles encompass industrial areas, suburban housing developments, rural and agricultural areas, and protected recreation areas. Larger in geographic area than Philadelphia, New York, and Boston combined, the high population density of major cities such as these remains in the distant future for Bucks County.

But unlike the major central cities, Bucks County is growing rapidly in population. From a total population of just over 144,000 at the time of the U. S. Census in 1950, Bucks County more than doubled its population in just ten years, numbering more than 308,000 residents in 1960.

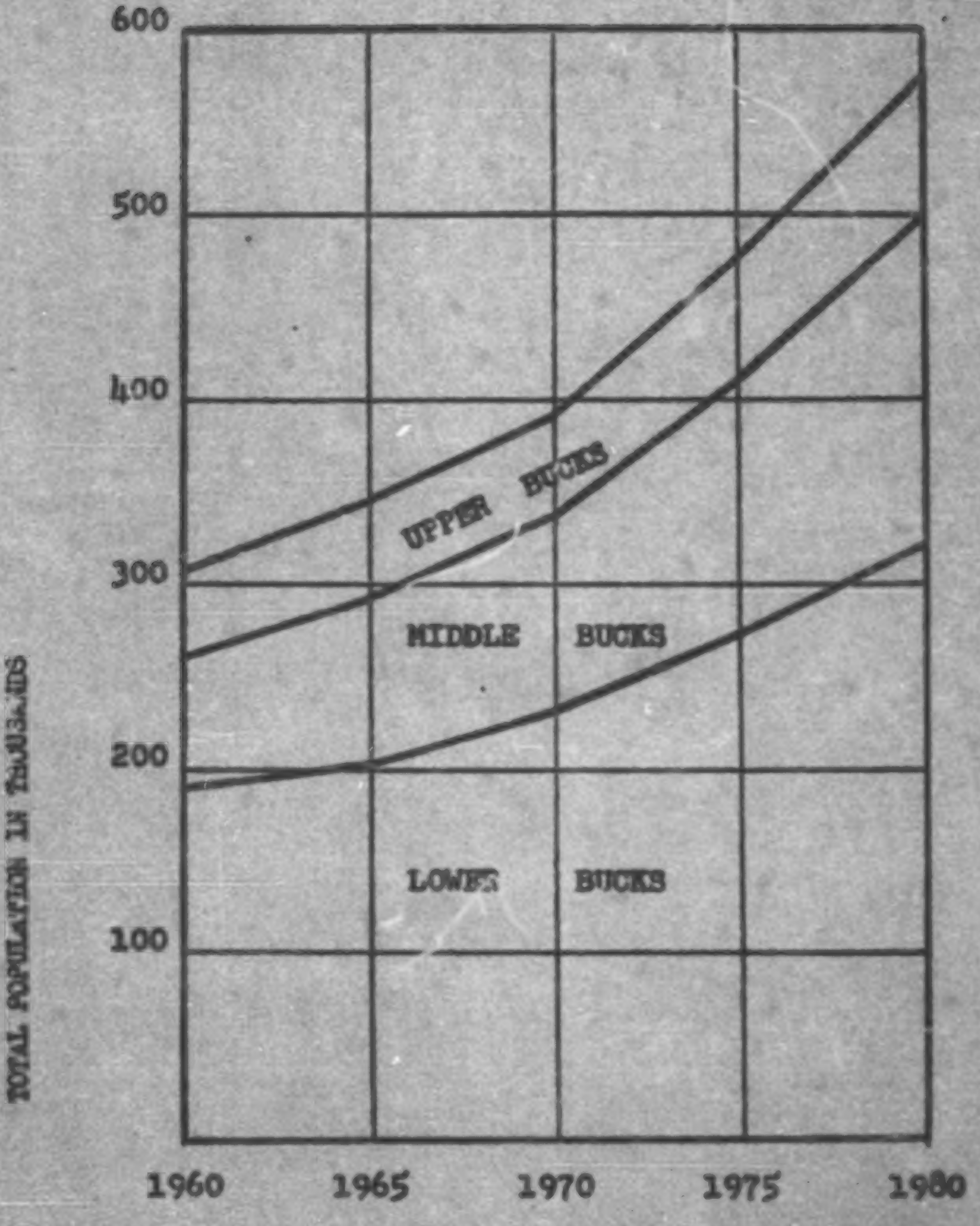
Population Growth, 1960-1980

What has happened since 1960, and what will be the County population in 1980? These questions have great significance for planning to provide post high school educational opportunities to meet the growing needs of residents of the County.

Figure 1 shows the County population in 1960, and the most likely estimates of County population at five year intervals on through 1980. Starting from about 308,000 residents in 1960, Bucks County is expected to grow to about 574,000 residents in 1980, for a growth of about 86% in 20 years.

FIGURE I

BUCKS COUNTY POPULATION PROJECTIONS BY REGION



These are, of course, estimates--but they are estimates carefully prepared using methods that have proved highly accurate in predicting growth in the past, both in Bucks County and elsewhere. Appendix A, "Estimates of Future Population Growth by School District, Bucks County, Pennsylvania", gives details about the methods used and about factors which can cause the actual population growth to change from the estimates. Taking into account all the factors (but not national disasters), estimates of population range from an extreme low of 515,600 in 1980 to an extreme high of 634,100 in 1980.

The preferred estimate--which indicates a total population of 574,500 in 1980--is the one used throughout this study. It is the basis for estimating the numbers of high school seniors and adults seeking education in 1980, and is thus the basis for estimating the adequacy of existing and planned educational resources for post high school education.

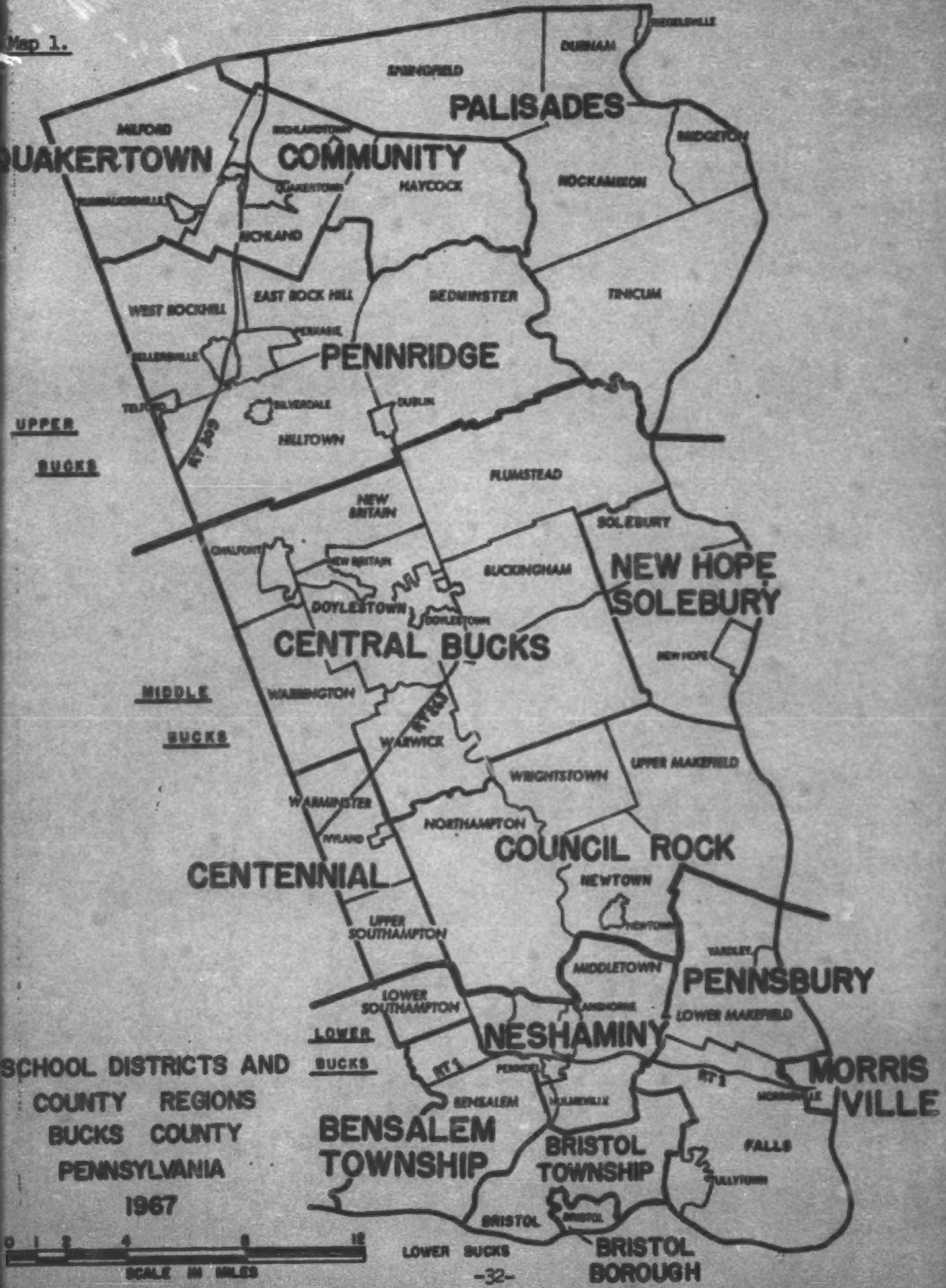
How reliable are these population estimates? Comparing results of the methods used in this study with independent estimates made by other organizations using different methods suggests that we can rely to a high degree on the total population estimate of about 574,500 in 1980. Population estimates for Bucks County made by the Delaware Valley Regional Planning Commission, Temple University, and the Bucks County Planning Commission all fall within the possible range of error mentioned above. In fact, they agree quite closely with the total population estimate used in this study. When the U. S.

Census of 1970 is completed, it will be possible to revise the population estimates based on actual experience and adjust plans accordingly.

Components of Population Growth

Because of the large geographic area covered by Bucks County, it is important to estimate not only total population, but also to estimate where that population will be located in 1980. Map 1 shows how the County was divided into three major areas, and Figure 1 shows the present and expected distribution of population within those major areas through 1980.

Map 1.


RIEGELSVILLE
DURHAM
SPRINGFIELD
PALISADES
BRIDGETON
MILFORD
RICHLANDTOWN
UAKERTOWN
COMMUNITY
HAYCOCK
NOCKAMIXON
TRUMBAUERSVILLE
QUAKERTOWN
RICHLAND
WEST ROCKHILL
EAST ROCK HILL
BEDMINSTER
TINICUM
PERKASIE
PENNRIDGE
SELLERSVILLE
TELFORD
SILVERDALE
DUBLIN
HILLTOWN
RT 309
UPPER
BUCKS
PLUMSTEAD
NEW BRITAIN
SOLEBURY
CHALFONT
NEW BRITAIN
BUCKINGHAM
NEW HOPE
SOLEBURY
DOYLESTOWN
DOYLESTOWN
CENTRAL BUCKS
NEW HOPE
MIDDLE
BUCKS
WARRINGTON
RT 611
WARWICK
UPPER MAKEFIELD
WRIGHTSTOWN
WARMINSTER
NORTHAMPTON
IVYLAND
COUNCIL ROCK
CENTENNIAL
NEWTOWN
NEWTOWN
UPPER SOUTHAMPTON
YARDLEY
MIDDLETOWN
PENNSBURY
LOWER SOUTHAMPTON
LANGHORNE
LOWER MAKEFIELD
NESHAMINY
LOWER
BUCKS
PENNDEL
RT 1
RT 1
MORRISVILLE
MORRIS
VILLE
BENSALEM
HULMEVILLE
BENSALEM
TOWNSHIP
BRISTOL
TOWNSHIP
FALLS
TULLYTOWN
BRISTOL
BRISTOL
LOWER BUCKS
BRISTOL
BOROUGH
0 1 2 4 8 12
SCALE IN MILES

SCHOOL DISTRICTS AND
COUNTY REGIONS
BUCKS COUNTY
PENNSYLVANIA
1967

It can be seen from Figure 1 that in 1980 the greatest proportion of the population will be in Lower Bucks, with the smallest proportion in Upper Bucks. Middle Bucks is expected to experience the most rapid rate of growth, while the greatest increase in actual numbers will be in Lower Bucks. By 1980, Lower Bucks alone is expected to have a greater population than did the entire County in 1960.

This geographic pattern is generally an extension of existing trends. In the 1950's, County development was most intensive along Route 1 between Trenton and Philadelphia in Lower Bucks. During the 1960's, active development has tended to move out along Old York Road through Montgomery County and on to Middle Bucks. In the latter part of the 1970's, land for additional residential development will become relatively scarce in Lower Bucks, and the intensity of development will shift gradually towards the Bethlehem Pike in the 1980's and then on into Upper Bucks.

This study is particularly concerned with graduating high school seniors--who seek certain types of post high school educational opportunities--and with adults, whose needs and desires for further education are somewhat different. (Adults are defined as all persons over age 15 who are not enrolled in grades 1-12.) How will the population of these groups change through 1980? Table 1 shows the expected changes in the numbers of students enrolled in high school senior classes, whether in public, private or parochial schools. These estimates are for

Bucks County residents, and do not include students in private or parochial schools who live outside Bucks County. Notice that while the total population of the County is expected to grow about 86% during the period from 1960 to 1980, the number of high school seniors is expected to grow by nearly 164% in the same time period--from about 3,265 high school seniors in 1960 to about 8,610 seniors in 1980.

Table 1

Estimate of Senior Class Enrollments

(Public, Parochial and Private)

Area	1960	1965	1970	1975	1980
Upper Bucks	540	890	1,050	1,100	1,110
Middle Bucks	735	1,380	1,685	2,320	2,660
Lower Bucks	1,990	3,035	4,125	4,660	4,840
County Total	3,265	5,305	6,860	8,080	8,610

The much greater relative growth in numbers of high school seniors reflects both changes in the age distribution of the population in Bucks County, and trends in "holding power" in the school systems, which result in a greater proportion of children continuing in school until high school graduation.

Adults, those over 15 years of age and not in grades 1-12, will also increase more rapidly than the total population. The number of adults is expected to grow from the 1960 total of 182,400 to about 361,200 by 1980, or an increase of about 99%. Table 2 shows the distribution by geographic area of changes in the adult population.

Table 2

Adults over 15 Not Enrolled in Grades 1-12

(Thousands)

AREA	1960	1965	1970	1975	1980
Upper Bucks	27.9	31.1	34.4	40.1	46.1
Middle Bucks	41.6	54.9	63.6	85.2	111.8
Lower Bucks	112.9	121.7	141.9	170.1	203.3
County Total	182.4	207.7	239.9	295.4	361.2

As can be seen, the rapid overall growth of population in Bucks County does not fully reveal the even more rapid growth in numbers of high school seniors and adults, for whom post high school education is of direct importance.

Population Growth Beyond 1980

What will happen after 1980? Will population growth taper off, or even decline? The answers to these questions will depend in part on the people of Bucks County themselves. Will they insist on low density residential development with large lots and single family dwellings, or will they encourage higher density development? Will they actively aid industry and commerce in establishing their businesses in the County? Will they provide the kinds of communities that attract new residents? Will they develop and support the educational systems--at all levels--that have become critical in the decisions of many families and firms who consider moving to new locations?

Even without the answers to these kinds of significant questions, it is reasonable to assume that Bucks County will continue to experience major population increases on into the 21st century. Projections for the United States as a whole uniformly estimate continued population growth well beyond the year 2010, and the major difference is in just how fast various experts believe the population will grow. Estimates by the Bucks County Planning Commission suggest a population of nearly 800,000 in Bucks County by the year 2010. Whether this estimate is precisely accurate or not (and no one suggests it is any more than an estimate), there seems to be no reason to think that needs for post high school education will decrease after 1980. Continuing increases in needs are far more likely.

CHAPTER IV

EMPLOYMENT AND EDUCATION

The large and rapidly increasing numbers of graduating high school seniors and adults in Bucks County suggests that there will be an increasing need for post high school education opportunities through 1980. But will that need be significantly affected by factors other than population growth?

While this study gives special attention to the social demand aspect of needs--what people want to achieve--economic factors also deserve serious consideration. Employment prospects are particularly relevant to any consideration of post high school education planning.

What are the major relationships of employment and education? The National Commission on Technology automation, and Economic progress stated in its report issued in 1966, "From the purely economic point of view, education has three principal effects: (1) it can increase the versatility and adaptability of people with respect to vocations and thus increase their capacity to adjust to change; (2) it can open up increasing opportunity to persons who might otherwise have difficulty in finding and holding employment; and (3) it can increase the productivity of workers at any level of skill or ability. Though education is much more than a means of economic progress, it is a decisive factor in the ecomonic advancement of any country."

Education and Income

Education is important not only to the economic advancement of countries (and counties), it is also important to the economic advancement of individuals and families. Table 3 gives some idea of the relationship of income to education, based on statistics of the U. S. Department of Commerce. Notice that while employed females numbered about 75% of employed males, females are far more likely to be employed in part-time jobs, and thus to attain a lower median (mid-point) annual income.

Table 3

Median Total Money Income in 1965

Total U.S. Male and Female Over 25 With Income

	Number	8th Grade	High School	1-3 Yrs. College	4 Yrs. College
Males	47,990,000	$4,210	$6,458	$7,222	$8,748
Females	32,976,000	$1,388	$2,544	$2,676	$4,293

Source: Statistical Abstract of the United States, 1967, Table No. 161.

Employment Trends

Men and women with education beyond high school are likely to earn more income. And at the same time, the changing U. S. economy tends to require increasing levels of education both in existing types of employment and in the new types of jobs that are being added to the economy. Appendix B, "Employment and Education in Bucks County", gives detailed attention to the characteristics of employment in Bucks County, the surrounding metropolitan areas, and the Nation as a whole.

A capsule view of the increasing importance of education to employment is given by the 1966-67 *Occupational Outlook Handbook* issued by the U. S. Department of Labor which states, "The developments in every broad occupational group seem to call for even more education and training. And the need for educational and skill upgrading will not be confined to the rapidly growing professional and technical fields, nor even to white-collar employment generally. "The demand for better educated and trained workers appears to be all inclusive." "People with a better education are not only likely to earn more, but they are likely to see their earnings rise for a longer period than those with limited schooling." "Unemployment falls heaviest on workers with the least education."

Table 4 shows the broad shifts in employment for major occupational categories, along with the educational level which had been exceeded by 50% of the people in each category in 1966. These educational levels for each category of employment have been rising steadily as older persons who did not have even high school available in their youth are gradually replaced by younger people who have continued their education through and beyond high school. As a consequence, new workers entering occupations usually possess levels of education appreciably higher than the median level of all workers in that occupation.

Table 4

Changes in U.S. Employment

1960-1975

	Numbers 1960*	Projected 1975*	Increase In Nos.*	Percent Increase	Median Education 1966
Professional & Technical	7,475	12,900	5,400	72.6%	16.3
Managerial	7,067	9,200	2,200	30.2%	12.6
Clerical	9,783	14,600	4,800	49.2%	12.5
Sales	4,401	5,800	1,400	31.8%	12.5
Craftsmen, Foremen	8,560	11,400	2,900	33.2%	11.9
Operatives	11,986	15,000	3,000	25.1%	10.7
Service	8,349	12,600	4,200	50.9%	10.9
Laborers	3,665	3,700	100	1.0%	9.5
Farmers	5,395	3,500	-1,900	-35.1%	8.8
Total	66,681	88,700	21,000	33.0%	

*Thousands of employees.

Employment Prospects for Bucks County Residents

At this time when about 20% of all families in the United States move their place of residence each year, the residents of Bucks County cannot be thought of as restricted to employment where they now live. High school seniors have the opportunity to pursue their education, their employment and their lives in other parts of the Nation. Adults, although somewhat less free to move, have a similar opportunity to change their places of residence and employment. In addition, they may live in one jurisdiction and work in another. According to a recent report by the Regional Science Research Institute on "Interdependence in the Penjerdel Region", over 40,000 employed residents of Bucks County now commute to jobs outside the County. This segment of Bucks County's working population is employed in jobs mainly located in the Philadelphia metropolitan area, and to a smaller extent in the Trenton metropolitan area.

In what kinds of occupations are Bucks County residents employed? Table 5, which is repeated from Appendix 2, is based on 1960 census information. It shows the number of employed Bucks County residents in major occupational categories which would be expected if all jobs in the Philadelphia metropolitan area were divided in proportion to population in each jurisdiction. It also shows the categories in which Bucks County residents were actually employed. The "difference" column shows whether there were more or fewer County residents in each category than there would have been if County employment had the same proportions as overall employment in the metropolitan area. It is clear that Bucks County residents have substantially higher than "average" employment in occupations requiring education beyond high school, including occupations requiring both degree and non-degree educational preparation. In fact, about 43% of Bucks County residents were employed in occupations such as craftsmen, foremen and operatives where non-degree post high school education is particularly important.

Table 5

Differences in Occupational Distribution in Philadelphia SMSA and Bucks County (1960)

Occupation Group	Expected Bucks County	Actual Bucks County	Percent	Difference
Prof., tech., related	13,009	14,350	13.0	+ 1,341
Managerial, Official, Prop.	8,996	10,084	9.2	+ 1,088
Clerical and kindred	18,643	14,743	13.4	- 3,900
Sales Workers	8,356	8,400	7.6	+ 44
Craftsmen, Foremen	16,096	20,687	18.8	+ 4,591
Operatives	22,270	23,743	21.4	+ 1,473
Service Workers	11,763	7,671	7.0	- 4,092
Laborers	4,972	5,716	5.2	+ 744
Not reported	5,920	4,855	4.4	- 1,065
	110,025	110,249	100.0	

Source: Based on Table 84, PC(1)-40C, Census of Population-1960, Bureau of the Census.

Employers in Bucks County

Although Bucks County residents may be able to find employment elsewhere in the metropolitan area or in the Nation, they have especially close relationships with Bucks County employers. The County and local governments, school districts and other educational and private institutions, manufacturing industries, business firms, construction firms, financial organizations, and other enterprises in Bucks County all have a close interdependence. Together with all residents, employers in the County are sharing in the development of a social, political and economic community.

On a purely practical basis, the County resident who can find appropriate employment in the County may be able to reduce the cost and time of commuting to work, while he also adds to the success of a County enterprise and increases the County tax base. From the point of view of the employer, his ability to obtain a qualified work force is crucial to success or failure. And the necessity of recruiting employees from across the Nation may induce business to change location to an area where employee needs may be met more readily.

The results of a survey of major employers (those with more than 200 employees) in Bucks County are presented in Appendix B, so that only a few highlights of responses will be reviewed here. Of particular interest are the minimum education requirements which Bucks County employers expect of their employees. Table 6 shows the levels of education required by responding employers for major occupational categories. Notice that the employers uniformly consider high school or less to be entirely adequate preparation only for unskilled and semi-skilled employment, and that high school completion or education beyond high school is considered the minimum for all other categories of employment.

Table 6

Minimum Education Requirements of Bucks County Major Employers

	High School Grad.	Voc/Tech. PHS	Bus. or Commer. PHS	1-3 Yrs. College	4 or more Years College
Unskilled	30*				
Semiskilled	31*				
Skilled	14	16			
Service	20	3	1		
Sales	5	3	2	5	6
Clerical	22	2	7	1	
Administrative	1		4	16	8
Managerial	2		1	10	14
Semi-Prof.		5		12	4
Professional					24

*May be less than high school

- Rows do not total uniformly due to differences in types of employment among respondents.

But what are actual employment practices compared with what employers say is the minimum education requirement? Of the more than 5,000 new employees hired by responding employers in 1966, more than 40% had completed education beyond high school, which is consistent generally with both their stated requirements and with regional and national trends in educational requirements.

The survey of major employers is not a representative sample of all employers in the County, but it does provide valuable insight into the needs of employers, and tends to confirm what is seen in comprehensive statistics for the metropolitan region and for the nation in terms of trends in post high school educational requirements for employment. In addition, the responding employers made clear their continuing concern with education of employees.

Nearly all major employers responding to the survey provide some on-the-job training for employees, and over 70% provide partial or complete tuition refund for off-the-job employee training and education--but nearly all require that the courses be job related.

Based on the survey of adults presented in Appendix F, some 10,000 Bucks County employees are participating in some kind of on-the-job training sponsored by their employers, and about 9,000 more are planning to participate in such a program. An estimated additional 25,000 employees would like to participate in such programs. But many smaller employers cannot afford to provide training and education needed.

Are employers satisfied with the present state of training and education for their employees? According to employers who responded to the survey, they are not. The large majority of these major employers would like to have public education or training programs developed to augment or replace their own programs. Only 30% considered their needs too specialized, or for other reasons believed they would not be likely to use public programs. In addition to needs of present employers in Bucks County, public education programs beyond high school can be an important incentive to new businesses and industries considering location in the County.

Consensus on Employment and Education

Adults in Bucks County agree with employers on the importance of post high school education in relation to employment. As explained in Appendix F, adults surveyed in Bucks County value post high school education primarily for its economic benefits. Based on the survey, 64% of all adults in Bucks County who are now enrolled in post high school education or who are definitely planning to enroll give their major reason for enrollment as job-related--higher pay, promotion, etc. This result is even more significant when it is noted that these adults include housewives and retired and unemployed persons in the total.

There is evident consistency in the perception by both employers and employees in Bucks County of the importance of post high school education in terms of employment and income. These perceptions are borne out by County, metropolitan area and national statistics, projections of trends in educational requirements for employment, and by increasing growth in employment categories where educational requirements are greatest.

Increasing economic demands for post high school education thus add to the needs created by the rapidly growing adult and high school senior population in Bucks County.

CHAPTER V

POST HIGH SCHOOL EDUCATION RESOURCES IN AND AROUND BUCKS COUNTY

The combination of population growth and increasing employment requirements point toward large and rising needs for post high school education for Bucks County residents. What are the education resources available to satisfy these needs, and what are the trends for the future?

This study gives special attention to education resources in two geographic classifications. First consideration is given to programs offered within Bucks County. Second consideration is given to programs offered in the approximate commuting area surrounding Bucks County, which was defined as the area within approximately 45 minutes driving time of a central point in Lower Bucks, Middle Bucks, or Upper Bucks. A program offered within 45 minutes commuting distance of Upper Bucks may be well beyond any reasonable commuting distance of Lower Bucks, and this factor is taken into account when calculating the availability of programs in Chapter VIII.

Each institution offering programs in Bucks County or within commuting distance was surveyed to determine present offerings and other information. The detailed results of the survey are contained in Appendix C, "Post High School Education Resources In and Around Bucks County, Pennsylvania." Therefore, this Chapter will present only a summary view of resources.

Types of Post High School Education Resources

This study is concerned primarily with the opportunities for Bucks County residents to enter education programs beyond high school, and thus focusses on first year resources in the case of education programs which are of more than one year in length. As explained in Appendix C, resources have been classified into major types, using the following categories:

Four-Year Degree

Thirty-six four year colleges and universities are included in the study. Generally, they require high school graduation, a particular level of qualifying scores on entrance examinations, relatively high financial ability, and offer programs and courses leading to a baccalaureate degree.

Two-Year Degree and Transfer

Fourteen two-year colleges are included in the study. These colleges offer courses for college credit, confer two-year degrees, and usually also prepare students for transfer to four-year institutions. They also provide programs which do not confer college credit, and these programs are included separately in the next category. Three extension centers of universities are also included in the study. These centers offer college credit courses but usually do not provide the complete program required for obtaining a college degree.

Non-Transfer

Non-transfer programs provide a wide variety of important post high school education offerings, but do not give credit toward college degrees. Usually, they give certificates of completion. Included in this category are programs offered by nine public schools in Bucks County, 14 programs offered by universities and colleges, and 47 private trade, business and commercial schools.

What are the overall characteristics of these types of programs in and around Bucks County, and what are the major trends in capacity?

Post High School Education Resources In Bucks County

Only a small proportion of the post high school education resources within commuting distance of Bucks County residents are actually located in the County. Table 7 (which is taken from Appendix C where it appears as Table XVIII), shows the first year enrollment capacities of programs offered within Bucks County.

The numbers shown for 1966 are actual enrollments in the fall of that year. The numbers shown through 1971 represent plans for expanded capacity as reported by each institution offering programs. The numbers shown for 1980 are not plans, but are simple straight line extensions of the trend for each type of program: these extensions represent only very general indications of the possible status of program capacity in 1980 and were used as test assumptions for the analysis reported in Appendix G, "Comparison of Post High School Education Resources With Needs."

Certain characteristics of the various types of institutions offering post high school education programs in Bucks County are important in viewing the overall pattern of opportunities in Bucks County.

Four-Year Degree

The Delaware Valley College of Science and Agriculture, located near Doylestown, is the only institution in Bucks County which can award baccalaureate degrees. In the fall of 1966, the College provided first year enrollment space for 258 freshmen in day programs, and enrollment space for 208 evening students. Day students were all boarding students, nearly entirely from outside Bucks County, while evening students were largely commuters from within Bucks County, taking courses in business and liberal arts. Tuition costs are relatively high when compared with State universities, averaging slightly over $1,100 a year for day students and about $300 for evening students.

Table 7

RESOURCES WITHIN BUCKS COUNTY - ENROLLMENT SPACE PROJECTIONS

Type of Institution:	Est. 1966*	1967*	1968*	1969*	1970*	1971*	1975**	1980**
				Projections				
Day								
Degree								
4 Year Institution	258	250	280	290	300	320	400	500
2 Year Colleges	404	612	645	682	725	755	875	1,025
Extension Centers	-	-	-	-	-	-	-	-
Non-Degree								
2 Year Colleges	114	236	255	270	280	300	380	480
Extension Centers	-	-	-	-	-	-	-	-
Proprietary Schools	-	-	-	-	-	-	-	-
Total Day Enrollment Space	776	1,098	1,180	1,242	1,305	1,375	1,655	2,005
Evening								
Degree								
4 Year Institution	208	250	275	300	325	350	450	575
2 Year Colleges	425	370	390	405	425	445	525	625
Continuing Education Centers	570	615	675	760	820	900	1,220	1,620
Non-Degree								
2 Year Colleges	131	190	195	205	210	215	235	260
Proprietary Schools	-	-	-	-	-	-	-	-
Continuing Education Centers	12	40	60	80	90	100	140	190
Public Schools	4,776	5,875	6,425	6,920	7,520	8,115	10,495	13,470
Total Evening Enrollment Space	6,112	7,340	8,020	8,670	9,390	10,125	13,065	16,740
TOTAL BUCKS COUNTY	6,888	8,348	9,200	9,912	10,695	11,500	14,720	18,745

*Based on reports of responding institutions
**Based on straight line projection of 1970 and 1971 figures

Two-Year Degree and Transfer

Bucks County was the first County in the Commonwealth to establish a Community College. The College, presently being expanded, provides programs leading to two-year degrees and allowing transfer to four-year colleges and universities for students going on to complete work toward the baccalaureate degree. The College offers low tuition to Bucks County residents, averaging about $170 a year for day students ($325 for full-time students) and about $85 a year for evening students. An especially important aspect of the Community College is that it gives major preference to Bucks County residents for admission, which is not the case for other degree programs in the County or in the commuting area. Generally, admission is granted to any County resident who has completed an accredited high school program. Admission, of course, does not assure graduation, but the opportunity is provided for students to demonstrate their ability.

Temple University and Pennsylvania State University also offer degree-credit courses at a variety of locations in Bucks County. These programs are not formally organized to lead to a degree, but many of the courses give college credit which may be applied toward a degree at the parent institution or at other institutions which agree to accept the credit. These programs are offered in the evening, primarily in public high schools, which are called continuing education centers. There are no permanent facilities associated with the programs, nor do they afford college-level libraries, laboratories, etc. Costs of tuition are relatively low, and since most students are enrolled for a single course the average yearly cost is approximately $34.

Non-Degree

Programs which do not result in a college degree are offered by the public schools in Bucks County and represent, in numbers of enrollments, the major post high school education opportunity within the County. The area vocational-technical schools, as well as seven of the thirteen school districts, provide a variety of evening course offerings.

In the fall of 1966, about 290 Bucks County residents were enrolled in programs to complete high school, about 100 were enrolled in basic education for adults who have completed less than eight grades of school, and about 34 were enrolled in literacy programs. By far the majority, numbering about 3,300, were enrolled in a wide variety of special interest courses in general education. Trade and industrial, and technical programs offered in the two area vocational-technical schools in operation in the fall of 1966 provided post high school education capacity for almost 1,200 persons. Tuition costs for these programs vary, but are generally quite low, averaging about $30 a year. In nearly all cases any resident of Bucks County may enroll in these programs without meeting special requirements.

The public schools, already the major post high school education resource in the County, are planning to almost double their enrollment capacity by 1971. This does not involve construction of facilities beyond those which would normally be required by school districts for their elementary and high school programs, but does represent an awareness of the growing needs for post high school education in the County. If these plans for rapid growth are accomplished, and if the same rate of growth is extended through 1980, the public schools could provide for an enrollment capacity of about 16,700 persons in evening programs by 1980.

The Community College also provides programs which do not give degree credit, although they may lead to formal certificates in such fields as data processing, secretarial studies, and electrical technology. Tuition and admission requirements are essentially the same as for degree-credit programs. In 1966, enrollments in these programs were about 114 day students and 131 evening students, with 1980 projections of about 480 day students and 260 evening students. It should be mentioned here that the greater number of degree-credit enrollments in the Community College reflects the current interests of students applying to the College and could readily change in relative proportion to non-degree credit enrollments.

Post High School Education Resources Around Bucks County

There are a wide variety of post high school education resources located within approximately 45 minutes driving time of some part of Bucks County. Table 8 (which is taken from Appendix C where it appears as Table XVIII) shows the first year enrollment capacities of programs offered within the commuting area. Most of the program offerings are located in the City of Philadelphia. The numbers shown in Table 7 for 1966 are actual enrollments reported for that year. The numbers shown through 1971 represent plans for expanded capacity as reported by each institution. The numbers shown for 1980 are not plans, but are simple straight line extensions of the trend for each type of program, which give only general indications used in analysis in this study.

Table 8

RESOURCES SURROUNDING BUCKS COUNTY - ENROLLMENT SPACE PROJECTIONS TO 1980

Type of Institution:	Est. 1966*	1967*	1968*	1969*	1970*	1971*	1975**	1980**
				Projections				
Day								
Degree								
4 Year Institutions	17,171	17,177	17,940	18,628	19,124	19,186	19,434	19,774
2 Year Colleges	2,456	3,697	4,087	4,982	5,705	6,337	8,865	12,025
Extension Centers	751	830	940	980	1,030	1,080	1,280	1,530
Non-Degree								
2 Year Colleges	2,045	2,801	3,306	3,989	4,501	5,275	8,391	12,241
Extension Centers	337	320	320	330	395	445	645	895
Proprietary Schools	7,973	10,184	10,989	11,584	12,134	12,559	14,259	16,384
Total Day Enrollment Space	30,733	35,009	37,582	40,943	42,889	44,882	52,654	62,819
Evening								
Degree								
4 Year Institutions	33,957	36,322	37,636	38,183	39,086	40,233	44,821	50,556
2 Year Colleges	1,393	2,852	3,570	4,310	4,975	5,825	9,225	13,475
Continuing Education Centers	1,297	1,209	1,440	1,808	2,250	2,909	5,545	8,840
Non-Degree								
2 Year Colleges	3,899	5,043	5,738	6,863	7,848	9,113	14,253	20,678
Proprietary Schools	6,288	8,333	9,161	9,815	10,205	10,503	11,695	13,185
Continuing Education Centers	2,320	1,865	2,305	2,865	3,410	3,980	6,260	9,110
Total Evening Enrollment Space	49,154	55,624	59,850	63,844	67,774	72,563	91,799	115,844
TOTAL SURROUNDING BUCKS COUNTY	79,877	90,633	97,432	104,337	110,663	117,445	144,653	178,663

*Based on reports of responding institutions

**Based on straight line projection of 1970 and 1971 figures

In general, it should be mentioned that the inclusion of information about these program offerings does not mean that they are available to Bucks County residents in actual practice. In addition to the factors noted in the following paragraphs, many of these programs are restricted in their actual availability to Bucks County residents due to costs; times at which programs are offered; admission restrictions as to residence, sex, religious denomination, and academic ability as measured by entrance examinations; types of programs offered; and similar factors. These factors are taken into account in comparing resources with needs in Chapter VIII. In addition, these programs serve a metropolitan region of about six million persons and give no preference to residents of Bucks County. In some cases, such as Community Colleges in surrounding counties, residence in Bucks County would actually reduce the possibility of admission. This competitive aspect is taken into account in Chapter VIII, along with competition from across the nation in the case of major colleges and universities. For the moment, the important point is that these factors sharply limit the actual availability to Bucks County residents of the program resources summarized in Table 8.

Four-Year Degree

Four-year colleges and universities in the commuting area provided first year enrollment in 1966 for about 17,000 day students and about 34,000 evening students. These institutions are characterized by relatively high tuition costs: over 70% charged more than $1,000 a year for full-time students. Admission requirements are generally high, and competition for enrollment in day programs is considerable: on the average, fewer than half of those applying are accepted. Over 80% of the students attending these institutions in their freshman year received no financial assistance from the institution. These institutions plan only a small increase in first year enrollment capacity by 1971, resulting in approximately 19,800 day spaces in 1980.

Evening programs of four-year institutions are both larger in capacity, and also are planned and projected at a higher growth rate. By 1980, these institutions may be able to accommodate about 50,500 students in evening programs, compared with about 34,000 in 1966. Admission requirements are more lenient for those taking credit courses which are not to be applied toward a degree. Because the large majority of evening students are part-time students taking one or two courses, tuition costs are lower than for day programs, averaging less than $200 per year for evening students.

Two-Year Degree and Transfer

Community Colleges outside of Bucks County account for the major part of first year enrollment capacity in two-year degree programs, which provided a total capacity for about 3,400 day and evening students in degree programs in 1966. The establishment and rapid planned growth of community colleges results in day and evening capacity in 1980 estimated at about 25,500 for all two-year degree institutions, including junior colleges and other two-year programs. As is the case for the Bucks County Community College, admission preference is given to residents of the county which operates the community college, so that these spaces are available to Bucks County residents only after all applicants from the sponsoring county have been admitted.

Credit courses offered at extension centers and continuing education centers around Bucks County enrolled about 750 day students and about 1,300 evening students in 1966. Based on current plans reported by institutions operating these programs, possible enrollment capacity in 1980 is estimated at about 1,500 day students and 8,840 evening students. As mentioned previously, these programs are not committed to permanent locations and are subject to policy changes of the sponsoring institutions. Generally, however, these programs tend to respond to the interests of applicants in the location where they are offered.

Non-Degree

Proprietary schools, located predominantly in the City of Philadelphia, make up the largest part of post high school education resources which do not lead to a college degree. These schools are business enterprises licensed by the Commonwealth to conduct courses in a variety of subject areas, ranging from computer programming through business administration, secretarial training, dental technology, music, fashion designing, and automobile repair. While costs of attendance vary considerably, the approximate average cost of completing a program, or the first year of a program where longer than one year, is estimated at about $400.

The planned and projected enrollments shown in Table 8 are judged to be more subject to fluctuation than for any other type of program. To a large degree, these plans and projections represent the numbers of students which the proprietary schools hope to be able to enroll, along with the estimates of owners as to the profitability of differing levels of operation. Even so, it is important that these proprietary schools look forward to rapidly increasing enrollments.

Two year colleges and extension centers also provide courses and programs which do not give college credit. As with two-year degree programs, community colleges around Bucks County account for the largest part of such programs, which would not be available to Bucks County residents unless excess capacity existed after all residents of the sponsoring county were admitted. In 1966, these institutions provided enrollment capacity for about 2,400 day students and evening enrollment capacity for about 6,200 students. Capacity in 1980 is estimated at about 13,100 day students (mainly community colleges) and about 30,000 evening students (two-thirds community colleges). Average yearly tuition costs for these programs range between

$200 to $400, depending on the number of courses taken and the type of institution.

The State Plan for Higher Education

In 1967, the State Board of Education issued A Master Plan for Higher Education in Pennsylvania. Several provisions of the Plan are relevant to the general review of post high school education resources in and around Bucks County now and through 1980. Of greatest importance, perhaps, is that there are no state universities or colleges in Bucks County, and there are none planned for the future. Nor are there plans for new state colleges or universities in the commuting area around Bucks County.

The State Plan specifically calls for emphasis on community colleges in meeting two-year educational needs, and recommends against branch campuses of State universities.

Although the State Plan is aimed specifically at programs leading to college degrees, it contains an important statement of policies relating to non-degree programs. Because these policies are likely to affect trends in post high school education, the following is quoted in its entirety from page 19 of the Plan:

> "one group of post-high school programs, which does not lead to a college degree, should be mentioned. These are vocational-technical

skill centered programs, up to two years in length. The importance and value of these post-high school programs have been underestimated for too long in Pennsylvania. There is a growing tendency throughout the country for parents and students alike to glorify a collegiate degree and to consider vocational-technical education as something less worthwhile. This attitude interferes with the development of such occupational programs. The effective operation of our increasingly complex society requires a large number of highly skilled technicians. Job opportunities for such people continue to grow. Without skilled technicians, the ideas of scientists, theorists, or engineers cannot be converted into practical utility.

"It is expected that occupational programs will be provided by area vocational-technical schools, community colleges, technical institutes, and in continuing education programs. Where such instruction is provided at a community college, it should be given a clear organizational identity so that the unique contribution to be made by high quality vocational-technical education will not be dominated by or confused with academic degree-oriented programs."

Summary of Trends in Post High School Education Resources

What are the general prospects for increases in post high school education opportunities for Bucks County residents through 1980?

Enrollment capacities in institutions granting four-year degrees are and will be extremely limited within the County. Within the commuting area, day enrollment capacity is growing slowly. Evening enrollment capacities, however, are estimated to be increasing relatively rapidly, so that opportunities for part-time education may improve somewhat for those Bucks County residents willing and able to overcome the handicaps of commuting relatively long distances.

Based on plans of institutions within the commuting area, and also on recommendations in the State Plan, increasing needs for 1st year enrollments in degree programs will be met primarily by community colleges. The Bucks County Community College, which is the only community college practically available to Bucks County residents, is planning a substantial expansion of capacity, and may be capable of serving a greater proportion of the Bucks County population in 1980 than it serves at present.

Trends in vocational, technical and continuing education programs not leading to a college degree indicate increasing opportunities for Bucks County residents. Both the public schools in Bucks County, including the area vocational-technical schools, and the Community College report that they are planning substantial increases in program capacities. If these planned expansions are carried out and the rate of expansion continued through 1980, these important programs will provide greater opportunities for Bucks County residents than are now available.

Within commuting distance, proprietary schools offering vocational and technical education also report plans to expand capacities at a rate greater than population growth. The significance of these statements of plans, however, is somewhat uncertain.

In succeeding chapters the post high school education needs and activities of graduating high school seniors and adults in Bucks County will be reviewed, and then examined in the context of population trends, employment trends, and resource trends to arrive at an estimate of the adequacy of existing and planned resources.

CHAPTER VI

POST HIGH SCHOOL EDUCATION PROSPECTS OF HIGH SCHOOL SENIORS

Post high school education is especially important to graduating high school seniors, since they are at the point in their lives when they are generally most able to pursue the course of education which will prepare them for their occupational careers. At the same time, the multitude of possibilities open to them--including for many the prospect of military service, for others marriage, for still some others their first work experience--make the year or two following graduation a time of uncertainty and sometimes rapidly changing plans. Recognizing both the uncertainty of this period for young adults and the great importance of educational decisions and action, it is critical to gain a general understanding of the post high school education prospects of graduating high school seniors. What do they want, and what do they achieve in the year following graduation from high school? How are these factors likely to change by 1980?

To gain insight into these kinds of questions, a survey was conducted of all high school seniors who were residents of Bucks

County in April of 1967. Useable responses were obtained from 4,415 of the 5,120 seniors, or over 86% of seniors in public, private and parochial schools in Bucks County. Information on class standing and IQ were obtained from school records to aid in interpretation of survey results. The detailed results of the survey and record data analysis are presented in Appendix D, "Characteristics of High School Seniors in Bucks County, Pennsylvania." A second survey of a 20% sample of these seniors was conducted in the fall of 1967 to allow comparison of the plans of seniors before graduation with their actual activities after graduation. A total of 477 useable responses were received, or just under 11% of the seniors originally surveyed. The analysis of these results is presented in full in Appendix E, "High School Senior Follow-Up Survey."

Together, these surveys give an overall view of the aspirations, plans and initial achievements of seniors in carrying out their plans for post high school education. This Chapter summarizes findings of particular interest and presents estimates of trends in the post high school education prospects of graduating seniors.

Post High School Education Desires and Plans of Seniors

Of the 5,120 Bucks County high school seniors in the spring of 1967, about 76% expected to complete some kind of post high school education during their lives. Aspirations of boys were somewhat higher than girls. About 82% of the boys expected to continue their education, compared with about 71% of the girls. About 42% of all seniors expected to complete at least a baccalaureate degree program, and an additional 13% expected to complete some college education. About 20% expected to complete vocational, technical, commercial and business programs not leading to a college degree.

As might be expected, many of these seniors were unsure when and how they would achieve their goals. By April, about 44% of all seniors had succeeded in making definite arrangements to continue their educations. Another 11% planned to begin post high school education within the year following graduation. About 20% did not know when they would enroll in a program.

Based on interpretation of survey and record data, there appear to be close relationships among class rank, I.Q. and definite plans and arrangements for post high school education. Although there were frequent individual exceptions, students in the higher I.Q. ranges were also in the upper ranges in class rank, and also had made more definite arrangements for post high school education--usually for college degree programs, both two-year and four-year. Greater funds, both from families and scholarships and other sources, were generally available to these students.

As shown in Figure 1 and Table X in Appendix D, plans of seniors appeared to be generally realistic in terms of their apparent ability, as indicated by past academic success. Those with the most successful academic experience tended to plan for four-year college programs. Those in the mid ranges of academic success generally planned for the full range of post high school education programs, while those with the least prior academic success were more likely to have no plans for further education. However, substantial numbers of students in all IQ ranges and all categories of academic success had no definite plans for further education, representing about 45% of all high school seniors.

Nearly 50% of the seniors in Bucks County are girls, whose plans for post high school education are very similar to the plans of boys in terms of types of institutions, and in terms of degree and non-degree programs. In terms of subjects, more girls than boys plan to enter teacher education programs, and fewer plan to enter engineering and business programs. About 28% of the girls, compared with about 20% of the boys, have no intention of pursuing additional education, but only 3% plan to be occupied exclusively as housewives.

About 90% of those seniors who had applied to institutions for post high school education desired full-time programs. Of those who had not yet applied, but planned to continue their education, over 50% wanted part-time education programs. Finances are certainly a consideration in this regard. Of those seniors who planned to begin post high school education in the year following graduation, about 20% had not yet been able to arrange to meet all costs. About 28% of seniors who were delaying their education considered lack of funds a major factor, and 32% of those with no educational plans beyond high school considered lack of money a major factor.

The seniors showed a definite preference for programs within commuting distance of their homes. Over 50% of those who had applied (including those accepted) to post high school institutions wanted to be within commuting distance of home, as did over 65% of the remainder who had some plans for post high school education.

Occupational Aspirations of Seniors

Approximately 60% of seniors valued post high school education mainly for economic reasons, either because it was necessary in order to prepare for the occupation they wanted to pursue, or simply because they felt their earnings would be increased. The second most important reason given was for self-improvement, which tended to be more important for girls than boys. Only a few gave reasons such as parental emphasis, pursuit of athletics, to be with friends, or social considerations.

Based on survey responses, seniors appear to have generally high occupational aspirations. About 39% of all seniors expected to be employed in professional and managerial occupations, 20% in clerical occupations, 10% in technical and semi-professional occupations, 10% in skilled worker occupations, and smaller percentages in each of the remaining occupational categories, except for 11% in "other" which includes military service.

These occupational aspirations are somewhat high when compared to the post high school education plans of the seniors, and to the actual distribution of employment by occupational category in Bucks County and in the nation. For instance, about 39% of seniors aspire to professional and managerial occupations, which equal about 22% of employment in Bucks County and about 21% in the nation. At the same time, only 6% of seniors aspire to employment as sales and service workers, operatives, and general labor, which account for about 47% of employment in Bucks County and about 51% of employment in the nation as a whole. Although it may be desirable for seniors to set high goals for themselves, it would seem that improved understanding of occupational opportunities and the types of post high school education appropriate to the various occupations could enable graduating seniors to more effectively prepare themselves for the world of work.

Patterns of Post High School Education Enrollments, 1967-1980

What are the overall patterns of enrollments of Bucks County seniors in major types of post high school education programs at present? And how are these patterns likely to change by 1980?

Analysis of the initial and follow-up survey returns allow estimates of the approximate proportions of high school seniors who actually enrolled in some form of post high school education during the year following high school graduation. Table 9 shows estimates of enrollment by major type of program for seniors in the year following graduation in 1967, and also shows estimated enrollment by graduating seniors in 1980. These estimates are likely to be slightly high, due to statistical uncertainties as well as the assumed tendency of those responding to the survey to somewhat exaggerate achievement of post high school education plans.

Table 9

Estimated Proportions of Bucks County High School Seniors Enrolling in Post High School Education, 1967 and 1980

Type of Program	Est. % 1967	Numbers of High School Seniors '67	Est. % 1980	Numbers of High School Seniors '80
2 & 4 yr. degree	47	2,410	54	4,644
2 yr. non-degree	4.5	410	5	774
Bus/Commer, Voc/Tech	7.4	380	10	860
Continuing Ed. and other	.9	46	2	172
Total Going to PHS	59.8	3,066	71.0	6,450

Source: Based on data contained in Appendices, A, D and E.

By far the greatest proportion of those enrolling in post high school education in the year following high school graduation enroll in two-year or four-year degree programs. This proportion may seem high in comparison to enrollment in other types of programs, but it is actually well below the national average.

According to statistics prepared by the U. S. Office of

Education, the national average for graduating seniors going directly into two-year and four-year college degree programs was approximately 54% in 1965, and increases slowly each year. Why is the average for Bucks County seniors below the national rate when County residents are substantially above the national average in education, income, and other related factors? Part of the answer may be simply that Bucks County is part of Pennsylvania, where according to *A Master Plan for Higher Education in Pennsylvania*, "In 1965, only slightly more than one out of every three Pennsylvania high school graduates went on to college. Thus, Pennsylvania's present rate (36%) is seriously below the present national average (54%) and is still behind the national average of 1932 (39%)."

Although the proportion of Bucks County seniors going on to college is well above the rate for all of Pennsylvania, Bucks County seniors are undoubtedly affected by the relatively limited college opportunities available in Pennsylvania as compared with other states. Also of interest is that the State Master Plan estimates that only 51% of Pennsylvania seniors will go on to college by the year 1975, indicating the expected continuing lag of college opportunities in Pennsylvania.

Table 9 shows the proportions of graduating seniors who enroll in other major types of post high school education following graduation. While national statistics are not available for comparison, these proportions, totaling under 13% of graduating seniors, also seem to be low in comparison to employment requirements for post high school education other than college. It should be emphasized that these proportions do not represent what graduating seniors want to do, or what they are trying to accomplish--what the proportions represent is the degree to which they have been able to carry out their plans under present circumstances. In Chapter VIII we will examine the needs for post high school education which are not being met now and are not likely to be met through 1980 if present plans of educational institutions are carried out.

Given the present patterns of post high school education enrollment of seniors, and assuming no major changes in planned opportunities by 1980, what would be the likely numbers of seniors going on to post high school education? Assuming that enrollment in college degree programs increases only to the 1965 national average of 54%, and also assuming that other enrollments increase proportionately, Table 9 shows that the numbers of graduating seniors going directly into post high school education programs would more than double by 1980. This would mean a minimum increase of some 3,300 seniors going directly into post high school education.

The overall pattern for 1967 suggests that Bucks County graduating seniors achieve less in post high school education than the average across the nation. This situation is likely to be due to a variety of factors, only one of which is the limited opportunities available in the state as a whole. Other factors quite likely include the information and guidance available to seniors concerning educational opportunities and their relationship to employment, difficulty in financing desired education programs, and the limited availability of appropriate programs within reasonable distance of their homes.

Chapter VIII will consider changes which would increase the opportunities of seniors for pursuing post high school education. First, however, it is important to examine the patterns of post high school education desires and achievements of adults and to view the needs of the two groups in perspective.

CHAPTER VII

POST HIGH SCHOOL EDUCATION PROSPECTS OF ADULTS

To what extent are adults in Bucks County interested in post high school education? What are their plans, and to what degree do they put their plans into action? A survey of adults in Bucks County was conducted as part of this study to help answer these and other related questions, and the detailed results of the survey are presented in Appendix F, "Educational Needs of Adults in Bucks County."

In this study, the term "adults" includes all residents of Bucks County who were over 15 years of age and who were not enrolled in grades 1-12 in the public, private or parochial schools. These adults, who numbered approximately 215,000 in 1967 when the survey was made, included those who had left school before high school graduation, as well as high school graduates of recent years.

The survey of adults was conducted mainly during the summer months of 1967. A total of 4,719 useable returns were obtained, representing slightly over 2% of all adults in Bucks County. The results of the survey are considered to be generally representative of adults in the County, but it is obvious that the relatively small sample size does not allow as accurate estimates for adults as could be obtained for high school seniors, where 86% provided useable returns in the main survey. Therefore, the findings presented in this Chapter must be viewed as general indications, rather than precise estimates.

Desires and Plans of Adults

Based on survey returns, an estimated 77,000 adults, or 36% of adults in Bucks County think they may enroll in some form of post high school education during their lives. An additional 5.5%, or about 12,000 adults, have positive plans to enroll in the near future, and another 4.3%, or about 9,300 adults, are enrolled in a post high school education program. Thus a total of approximately 98,000 adults, or nearly 46% of all adults are estimated to be enrolled, planning enrollment, or to desire post high school education at some time in the future.

Why are adults interested in post high school education? As is true for high school seniors, economic factors seem to be the most important reason adults enroll in post high school education. Of those surveyed who were enrolled or planned to enroll, over 45% gave higher pay and job advancement as the most important reasons for enrolling. Another 18% enrolled to be more effective in their present jobs. Personal interests was the major reason cited by 36% of those enrolled, and tended to be a more important reason for women than for men.

Another aspect of adult interest in continuing education is shown by participation in on-the-job training programs. Estimated from survey results, about 10,000 employees who live in Bucks County were participating in on-the-job training programs, and another 9,000 adults had made plans to participate. An estimated 25,000 additional employees would like to participate in such programs.

Based on the adult survey returns, employers offer some support (tuition, time off or a combination) for off-the-job post high school education for about 14.5% of all adults, or about 30,000 employees, which tends to add impetus to the interest of adults in post high school education. At the same time, it appears that employers offer no support for off-the-job education for an even larger number of employees, estimated at about 43,000 employees living in Bucks County, or about 20% of all adults in the County.

While the possibility of improving their economic position is cited as the most important reason for enrolling in post high school education, about 32% of those who may enroll sometime give job demands as the major reason they have not yet enrolled. Another 28% of adults surveyed believe they can't afford enrollment. Thus changes in employer incentives such as time off and tuition assistance could have a major effect on actual enrollment by adults.

About 38% of those who may enroll but have not yet done so give family responsibilities as the major reason they are not enrolled, with this reason more likely to be given by women. Approximately 36% of those not enrolled believed that the courses they wanted were not available.

Patterns of Adult Enrollments and Plans

Because the adult survey was conducted mainly during the summer months when most of the evening programs offered by the public schools in Bucks County were not in session, the plans of adults for enrollment during the next 12 months are of even greater importance than actual enrollments at the time of the survey.

Of the adults surveyed, about 5.5% or 214 respondents reported plans to enroll in post high school education in the next 12 months. Expanded to the total adult population, this would indicate about 12,000 adults in Bucks County planning enrollment. Approximately 39% were interested in college credit courses, about 23% were interested in vocational-technical or business-commercial programs, and about 24% planned enrollment in continuing education (including high-school completion, adult education and general education).

In addition, about 4.3% of the sample, which would equal approximately 9,300 adults in the total population, were actually enrolled in post high school education at the time of the survey. Of these, approximately 62% were enrolled in four-year degree institutions, which includes college students enrolled beyond their freshman year as well as adults taking one or more individual courses for credit. About 12% of those enrolled were in vocational, technical, business and commercial programs; about 9% were in continuing education programs; and about 6% were in two-year, non-degree programs.

As reported in the adult survey, most adults were interested in part-time, evening programs, accounting for 63% of those with plans to enroll and 45% of those who were actually enrolled. The lower percentage for those actually enrolled is mainly due to the higher proportion of full-time college students in that group. Younger adults, under age 24, were also more likely to be interested in full-time, day programs. Only about two percent of those who planned to enroll or were enrolled expressed any desire to attend programs on the weekend.

Program interests of adults appear to be generally similar to those of high school seniors. Of those with plans to enroll, 20% are interested in business, 16% in liberal arts (including science), 15% in teacher education, and 14.5% in engineering and related technical courses. Of those actually enrolled, who included college students, 23% were in teacher education, 21% in liberal arts, 14% in business, and 13% in engineering and related technical courses.

What will be the general pattern of adult desires for post high school education in 1980? This is an extremely difficult question to answer from the information available, but there are two important aspects which can be estimated with reasonable assurance. First, we can expect the overall numbers of adults interested in post high school education to increase due to the expected growth of the total adult population by about 68% between 1967 and 1980. Second, the growing importance of post high school education in terms of employment requirements is evidently affecting adult interests now and is almost certain to be an even greater motivating factor in 1980.

Taking only population growth into account would lead us to expect a total of 143,000 adults in Bucks County to be interested in post high school education in 1980. What would their interests be, and to what extent would they be able to put them into action? The following Chapter examines these and other significant questions in relation to both adults and seniors, and in the context of resources and programs available and planned for the future.

CHAPTER VIII

MEETING POST HIGH SCHOOL EDUCATION NEEDS OF BUCKS COUNTY RESIDENTS, 1967 THROUGH 1980

What is the effect on post high school education needs of Bucks County residents of trends in population growth, employment, resources, and plans and activities of graduating high school seniors and adults? What post high school opportunities are needed? What proportion of needs will not be met if current patterns continue? What can be done to satisfy these needs? This Chapter offers general answers to these questions, based mainly on the results of analyses reported in Appendix G, "Comparison of Post High School Education Resources With Needs."

The general method which was used to obtain the results summarized in this Chapter is explained in Appendix G. Basically, the method used matches the characteristics of people trying to obtain post high school education against the characteristics of post high school education resources available to determine unmet needs.

Because the post high school education needs of people have many important differences, and because institutions also differ in a number of important aspects, it was necessary to include a large number of factors in the procedure for estimating needs not met. These factors included: population trends for seniors and adults; geographic locations of potential enrollees; location of institutions; eligibility and qualification factors; cost of programs; money available to people; time of day that programs are offered, and time of day people want programs; the probability that people will convert plans into action, and the probability that institutions will accept applicants; subjects desired and subjects offered; type of institution available and type of institution desired; and, in the case of high school seniors, trends in proportions continuing education beyond high school. These and other important factors were taken into account by developing computer programs capable of handling the immense number of details. Nevertheless, the result is simply to give a comparison of the difference between resources available and what people are trying to accomplish.

The recommendations contained in this Chapter resulted from extensive analysis of all findings by the study staff, intensive review by the study advisors, and deliberation by the Advisory Council on Post High School Education. The recommendations themselves, and the form in which they are presented are, of course, the responsibility of the study staff alone.

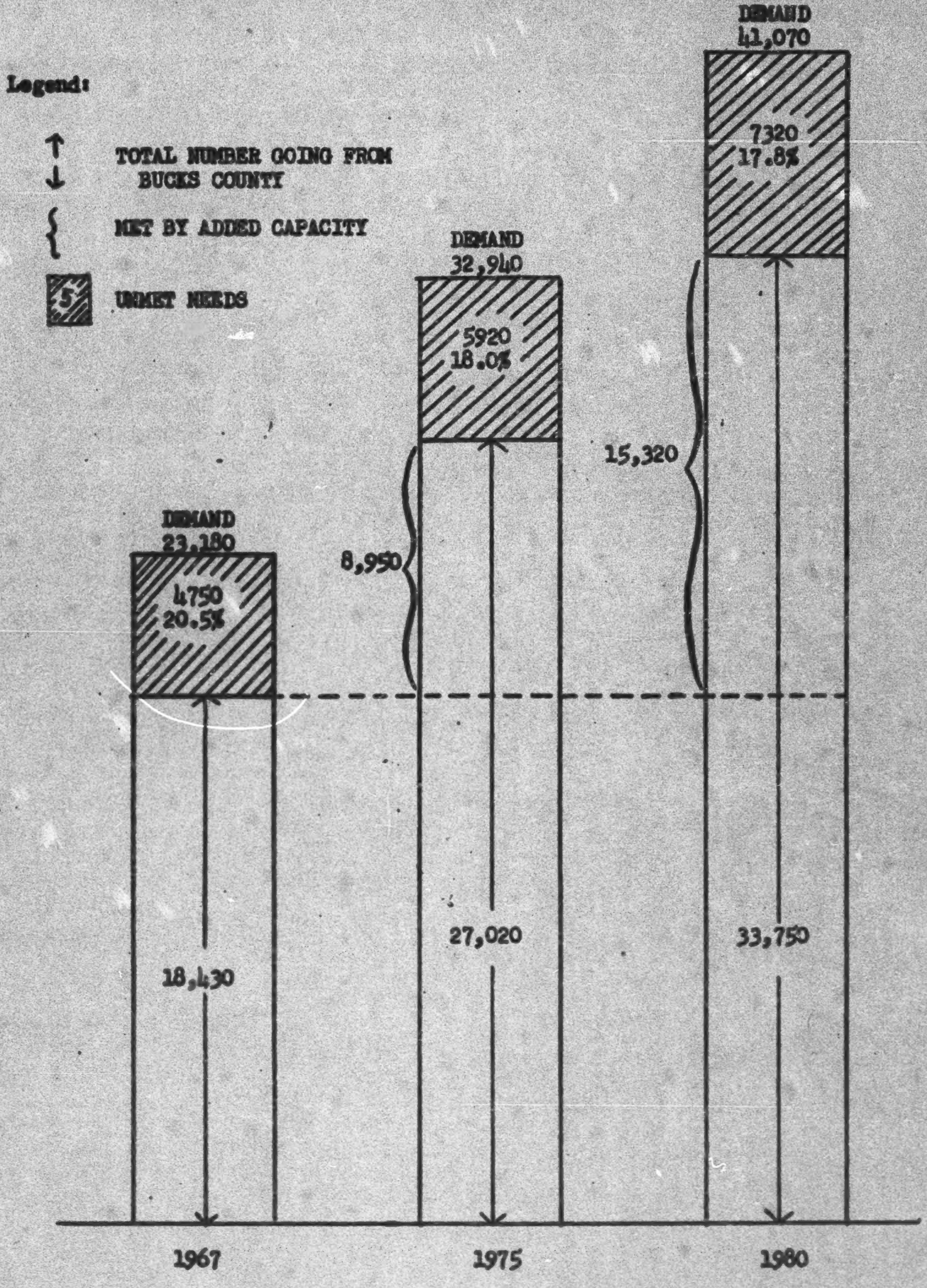
Total Demands for Post High School Education 1967-1980

What is the magnitude of total demands by Bucks County residents for post high school education of all types at present? How will this total demand change by 1980? To what extent do available and planned resources meet the demand, and what proportion of needs will not be met?

Figure 2 summarizes the results of analyses made to answer these important questions. The Figure shows that in 1967 the total demand of Bucks County residents for post high school education was about 23,200 people seeking enrollment, and that about 18,400 of these were able to enroll in programs appropriate to their needs, either in Bucks County, within commuting distance, or elsewhere. About 4,700 of those estimated to be actively seeking enrollment were not able to enroll. Thus, in 1967, there was an estimated unmet need of about 4,700 people, or about 20% of Bucks County residents seeking enrollment.

FIGURE 2

ESTIMATED TOTAL DEMAND FOR PHSE



As shown by Figure 2, the total demand is expected to increase to about 32,900 people in 1975. If increases in planned capacity reported by institutions are actually brought into being, the needs of about 8,600 people will be met by additions to resources beyond the 1967 level of capacity. Unmet needs would decline slightly in proportion, but increase somewhat in actual numbers, totalling about 5,900 people in 1975.

If the rate of planned increases in capacity is continued and the resources become available, there will be a further decline in the proportion of unmet needs by 1980, but there will still be an increase in the actual numbers, totalling about 7,300 people in 1980.

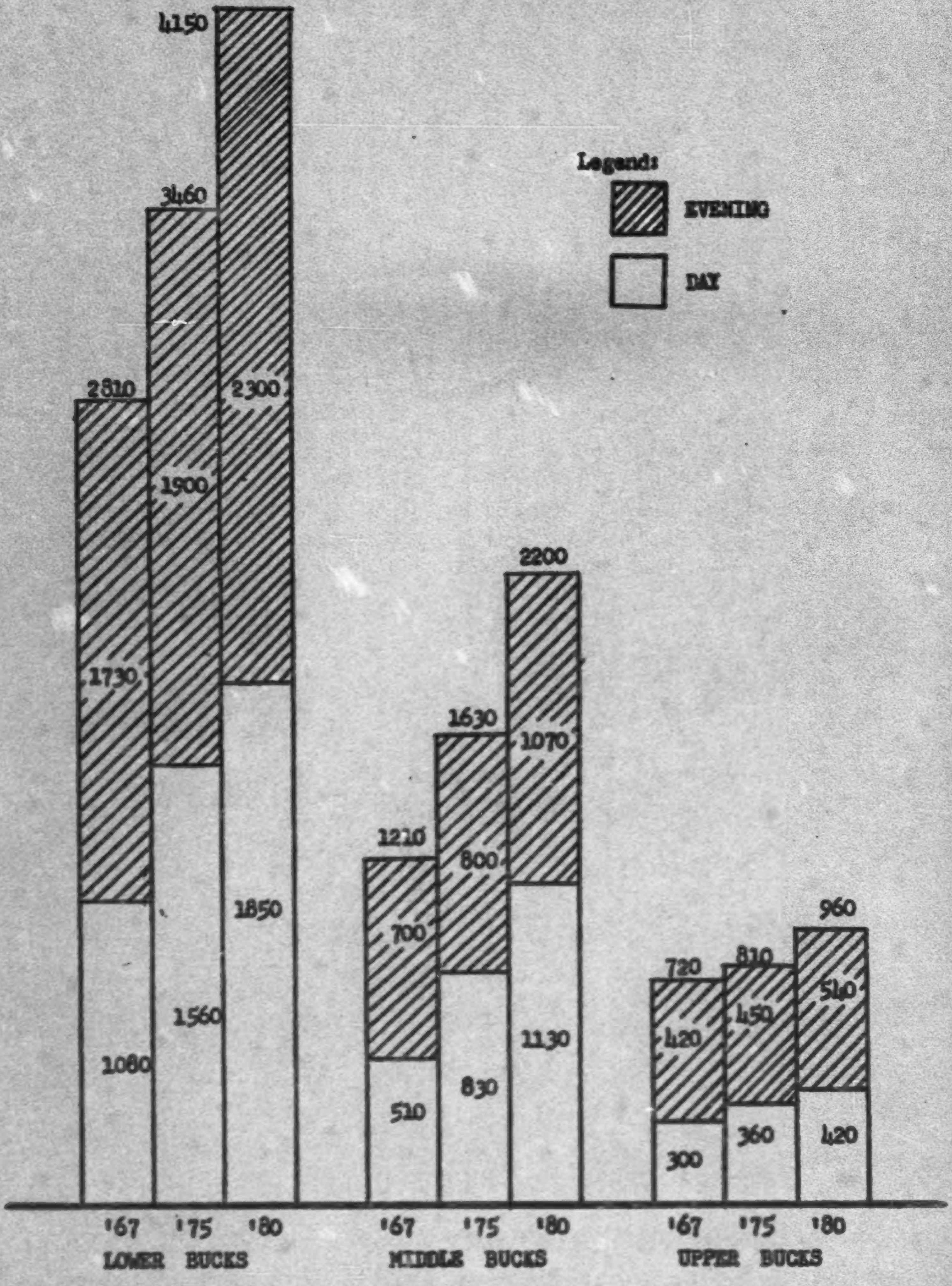
Two points are especially significant in this general picture of demand. First, planned increases in capacity must actually be carried out to meet the rapidly rising demand for post high school education. Second, there are now large numbers of Bucks County residents whose needs for post high school education are not being met, and this number will increase in the future even with the substantial increases in capacity represented by planned expansions.

Dimensions of Unmet Needs for Post High School Education

How are these unmet needs distributed among geographic areas in Bucks County, in time of day, and by major type of subject?

FIGURE 3

UNMET NEEDS BY COUNTY REGION

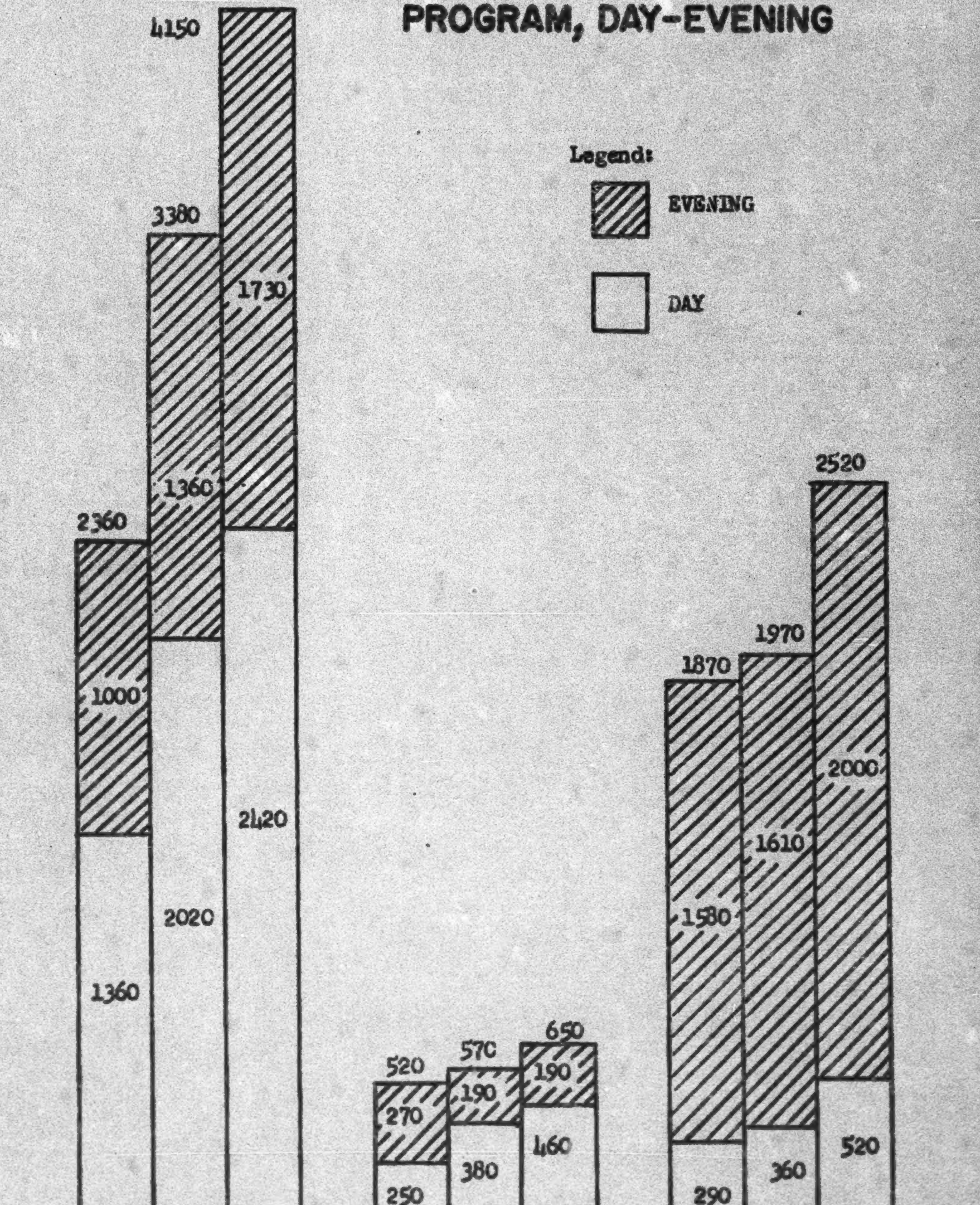


As shown in Figure 3, unmet needs are and will continue to be numerically greatest in Lower Bucks, smallest in Upper Bucks, and between the two ranges in Middle Bucks. Considering the distribution of total population, unmet needs are proportionately greater in Upper Bucks, which reflects its greater distance from most institutions which offer post high school education in and around Bucks County. The proportion of unmet needs for day programs and evening programs is about the same in each of the three geographic areas, with a slightly greater unmet need for evening programs generally prevailing.

Viewing total unmet needs in terms of broad categories of programs, four-year degree and credit programs are seen to account for by far the greatest number of unmet needs, as shown in Figure 4 (total demand, including needs which are met, is much greater for non-degree programs). Unmet needs for day programs predominate except for non-transfer programs which mainly serve adults whose days are committed to employment and other obligations. As will be discussed later in more detail, these relatively low unmet needs for transfer and non-transfer programs will result only if stated expansion plans of the institutions offering these programs are actually put into effect: otherwise, the unmet needs in these categories would be greatly expanded.

FIGURE 4

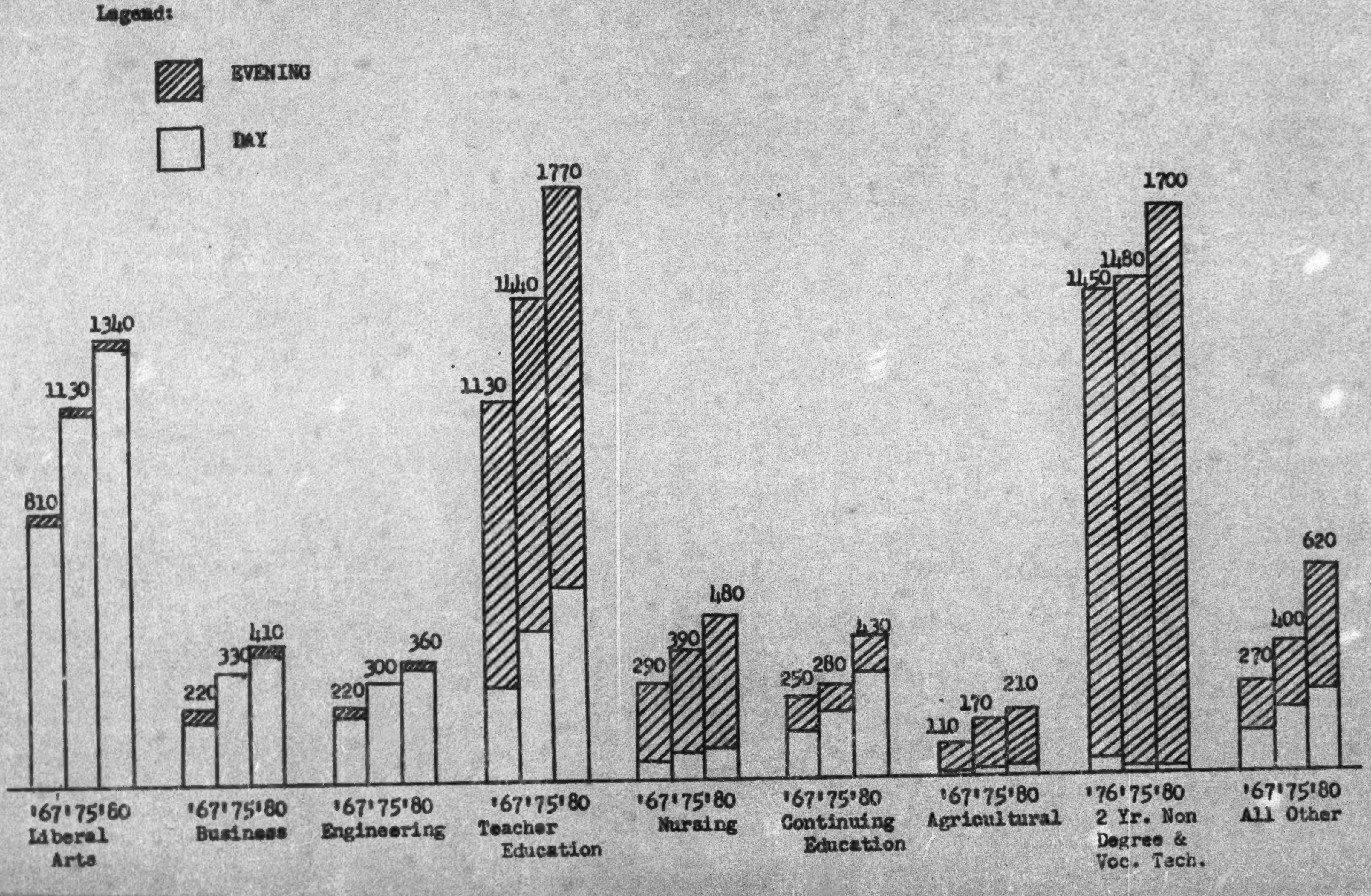
ESTIMATED UNMET NEEDS BY DESIRED PROGRAM, DAY-EVENING



In Figure 5, total unmet needs are shown in terms of subject areas of study sought by residents of Bucks County, with all types of programs (four-year degree, transfer and non-transfer) combined. In all subject categories where unmet needs were estimated to exist in 1967, the size of the unmet need increases through 1980. Teacher Education, which is the category of largest unmet needs, is a subject desired mainly in the evening--probably due to the needs of teachers in Bucks County who desire evening credit courses which will allow them to keep abreast of their profession and work toward advanced degrees.

FIGURE 5

ESTIMATED UNMET NEEDS BY DESIRED SUBJECT, DAY-EVENING



The unmet needs for day programs in liberal arts (which includes science), business, engineering, and the day component of the unmet need for teacher education, reflect the relatively large numbers of young high school graduates who want to go on to college in these programs but are unable to enroll under circumstances as they now exist and are likely to exist in the future.

The relatively large unmet needs for evening programs in the two-year non-degree vocational-technical programs mainly represent adults who are seeking business, commercial, vocational-technical and trade and industrial programs on a part-time basis. The much smaller day unmet needs in this category are mainly due to young adults, including recent high school graduates, seeking similar programs on a full-time basis.

These unmet needs will be examined in more detail in the following pages.

Meeting Needs for Non-Transfer Programs, 1967-1980

Non-transfer programs, which are all those not leading to a two-year or four-year college degree, are especially important to people in Bucks County. These programs provide the means for people who have not graduated from high school to complete their high school education; they are the vehicle for gaining job skills, or up-grading job skills, for more than half the working population; they offer the way to achieve personal objectives of self improvement; and they provide an opportunity for cultural development.

These important programs and courses include those offered by public high schools, area vocational-technical schools, the Community College, university continuing education centers, and by proprietary schools in the area surrounding Bucks County.

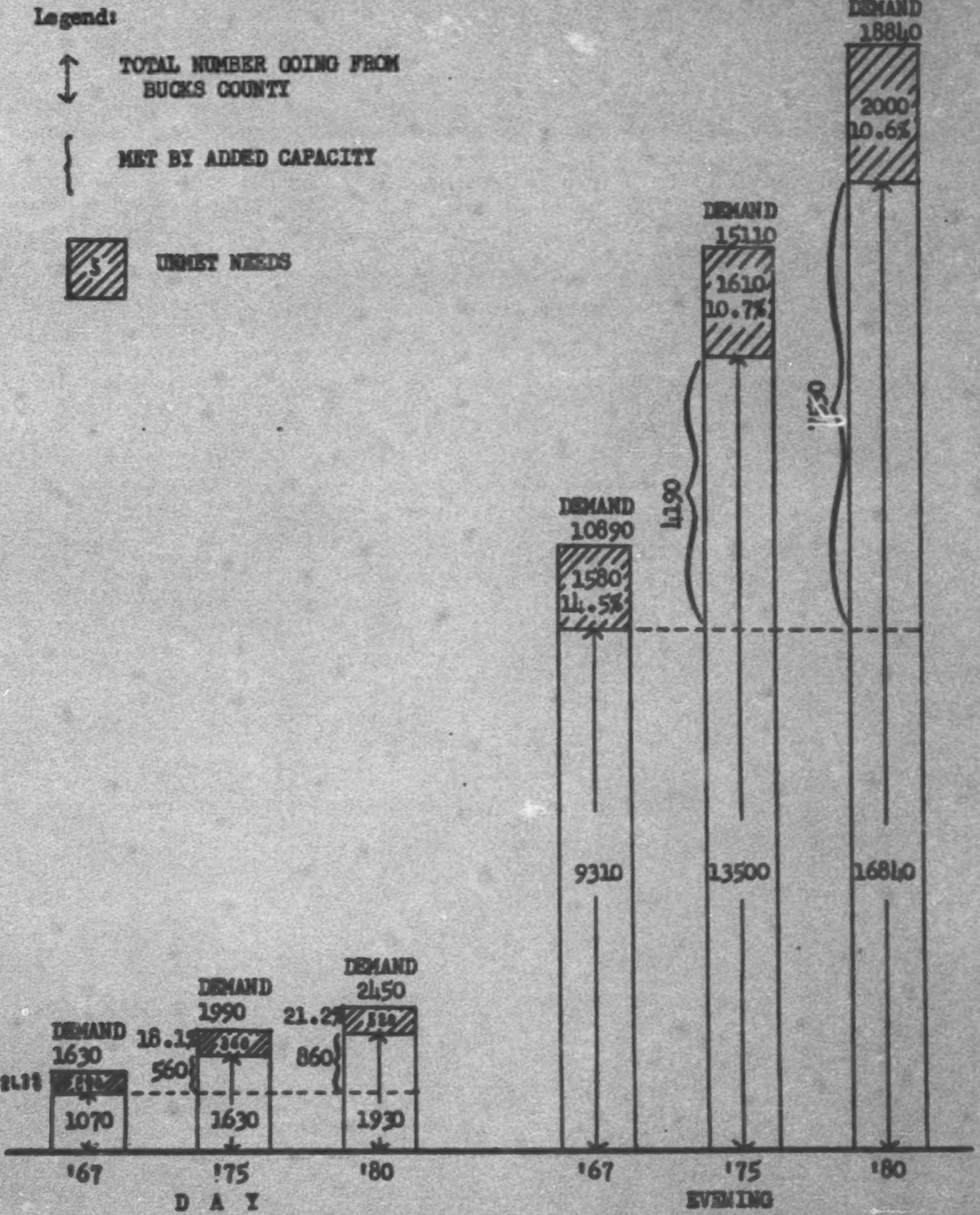
What are the demands of residents of Bucks County for post high school education which does not lead to a college degree? What are the unmet needs for these programs, and what are they likely to be in 1980, given present and planned resources?

Demand and Unmet Needs

As shown in Figure 6, these programs currently serve about 10,900 residents in day and evening programs, both within Bucks County and in the commuting area. By 1980, planned and projected increases in capacity of institutions offering these programs will serve an estimated 19,000 Bucks County residents. Because most people served by these programs have employment or family responsibilities in the day, the major demand for these programs is in the evening.

FIGURE 6

ESTIMATED DEMAND FOR NON-TRANSFER PROGRAMS



Even with the large number and variety of opportunities in these programs, there appears to be a substantial need by Bucks County residents which is not now being met, and this need is expected to increase in total numbers to about 500 potential enrollees in the day, and about 2,000 potential enrollees in the evening by 1980. At the same time, over 85% of evening demands and nearly 80% of day demands are being met. By 1980, planned and projected expansions are expected to allow meeting about 90% of evening needs, and to continue meeting 80% of day needs.

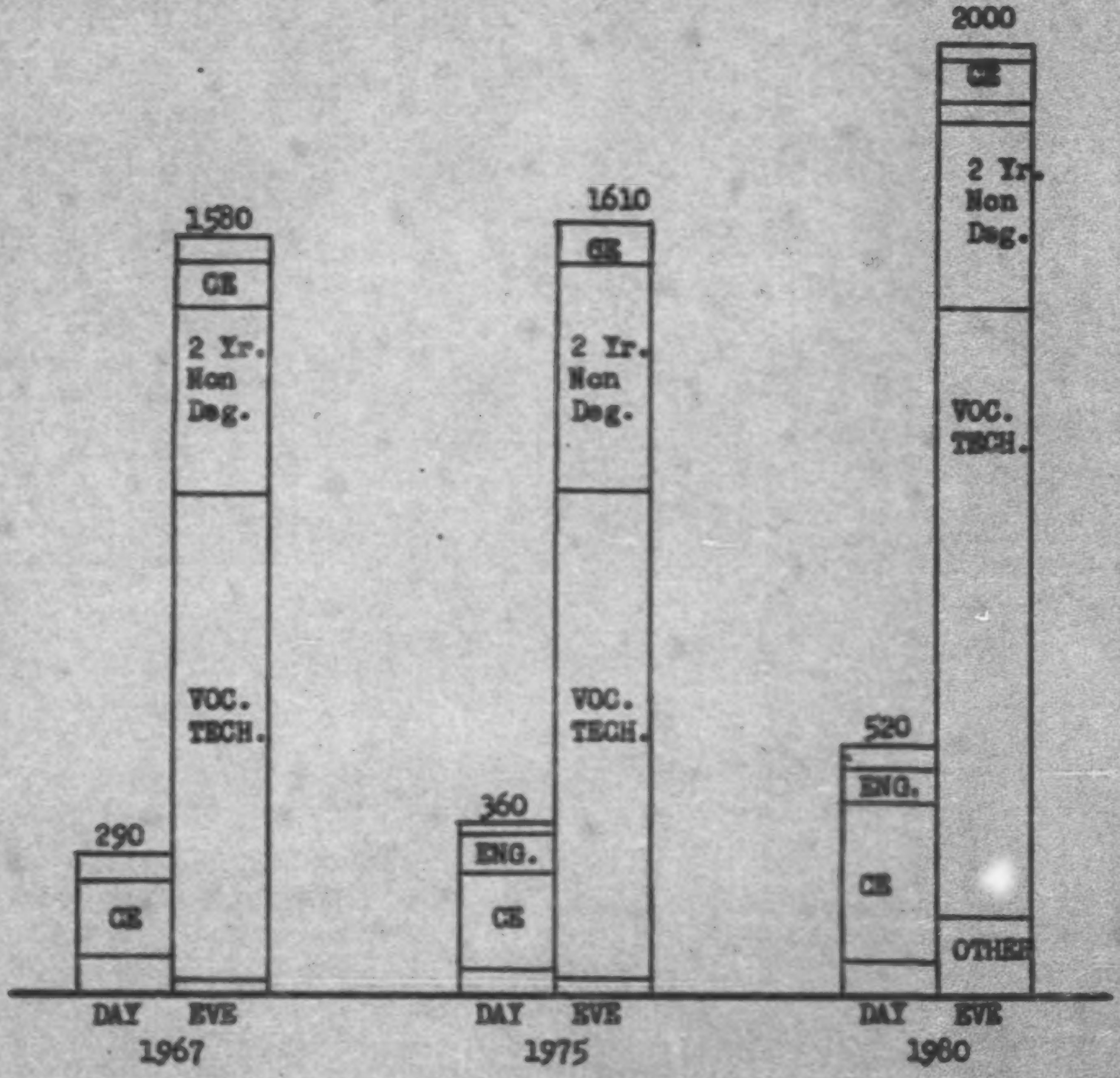
What are the characteristics of these unmet needs, and how can they be reduced? Figure 7 shows the types of programs desired by those whose needs are not being met as estimated for 1967, 1975 and 1980.

FIGURE 7

NON-TRANSFER PROGRAM UNMET NEEDS, BY DAY-EVENING, DESIRED SUBJECT

NOTE:

1. Subjects are shown in the following order;
   Liberal Arts
   Business
   Engineering
   Teacher Education
   Nursing
   Continuing Education (CE)
   Agriculture
   Misc. 2 Yr. Non Degree
   Vocational-Technical
   All Other
2. The subjects not identified fall in the blanks above, between, and below those identified.
3. One blank may indicate several subjects.



In the day, the predominant unmet need is in the category of Continuing Education programs, and mainly represents adult women who would like to have programs in art, hobbies, and other cultural subjects offered in the day. This is not considered to be a need requiring action, since these courses are now generally available in the evenings in the County high schools, and because the need is distributed throughout the County and thus does not appear large enough to warrant special programs at any particular location.

There are smaller unmet needs for day programs in subjects such as business, engineering technology, and others generally of the type offered by the public high schools, area vocational-technical schools, and the Community College. These unmet needs are due partly to adults who would like to take courses in the day which are now offered only in the evening, such as trade and industrial programs, but do not appear sufficient to warrant new programs. For the most part, however, these unmet needs represent interest by young adults in full time day programs such as those now offered by the Community College, and could be met by expanding these offerings at the College at a rate greater than now planned.

As shown in Figure 7, substantially greater unmet needs are estimated to exist for evening programs, both now and through 1980, particularly for programs of the types offered by vocational-technical schools and by the Community College. These estimated unmet needs are due entirely to a combination of two factors: the absence of particular course offerings desired by potential students, and the incomplete knowledge by potential enrollees of what actual course offerings are available. It should be noted here that the diversity of job skills, particularly in the case of manufacturing employers in Lower Bucks, leads to interest of employees in a wide variety of different types of vocational and technical education. Yet at the same time, the numbers of potential enrollees desiring a particular program may not be sufficient to make it practical to offer the program desired.

To meet these important unmet needs for job related evening programs will thus require action of two types. First, is action to increase the effectiveness of communications so that existing post high school education opportunities are more accurately known to those seeking programs and so that institutions are aware of the current program interests of potential enrollees. This aspect, which also applies to other types of post high school education, is the subject of recommendations later in this Chapter. Second, assuming that appropriate courses are made available, and potential students know of program offerings, there will be a need for increases in planned program capacity of vocational-technical schools, which is expected to be provided when the new area vocational-technical school now under construction in Middle Bucks is opened. Attention should be given to exploration of the possibilities of 13th and 14th year programs based on the capabilities of the area vocational-technical schools, with consideration to program interests of prospective students and employers. Expansion beyond that now planned by the Community College for its evening, non-degree programs will also be needed if the scope of courses is expanded and knowledge of their availability is gained by potential enrollees.

Conclusions and Recommendations

Bucks County residents are fortunate to live in one of the few Counties in Pennsylvania which have provided modern area vocational-technical schools and a Community College. Together with the public high schools, these institutions provide vital post high school education programs which meet the major part of the needs of resident's for a wide variety of programs. These institutions plan to expand their programs substantially through 1971, and if this rate of expansion is continued through 1980 they will be capable of keeping pace with the rapidly growing numbers of Bucks County residents seeking post high school education. Statements of plans, however, must be accompanied by action if these large and vital needs are to be met.

Recommendation 1.--Bucks County public schools should plan to increase evening post high school enrollment capacity to a total of at least 13,500 enrollments in 1980, which will be an increase of about 8,700 or some 180% over the 1966-67 enrollments of about 4,800. Enrollment capacity in technical, trade and industrial programs in vocational-technical schools should be increased from the 1,200 enrolled in 1966-67 to an enrollment of at least 3,300 in 1980. Enrollment capacity in adult and continuing education programs in high schools should increase from the 3,600 enrolled in 1966-67 to an enrollment of at least 10,200 in 1980. Particular attention should be given to vocational needs in these programs, and to expanding the variety of job-related offerings. The potential of 13th and 14th year programs in the area vocational-technical schools should be explored in terms of interests of both students and employers.

Recommendation 2.--The new Middle Bucks Area Vocational-Technical School when completed, and the six school districts which do not now offer post high school evening programs, should give serious attention to beginning, or cooperating in the development of post high school education evening programs. Although the school districts now offering evening post high school programs allow enrollment from outside their own districts, the absence of programs in six school districts, including school districts in Middle Bucks and Lower Bucks where demand is greatest, reduces the availability and convenience of such programs to a substantial number of Bucks County residents.

Recommendation 3.--The Community College should increase its non-transfer 1st year enrollment capacity to at least 1,100 by 1980, as compared with 1966-67 enrollments of about 246.

Approximately 500 of these enrollments should be planned for day, and approximately 600 for evening. These expansions should increase the variety of offerings available, and should be related to changing requirements for job skills in the County. Student counselling in relation to both educational program and employment opportunities should receive emphasis.

Two-Year Degree and Transfer Programs

Post high school education programs leading to a two-year degree also allow transfer to four-year colleges and universities for completion of studies leading to a four-year degree. Two-year degree programs are offered in Bucks County only by the Community College. In the commuting area, two-year degree programs are offered by community and junior colleges and by branch campuses, called extension centers, of Pennsylvania State University and Temple University. As discussed in Chapter V, the State Master Plan for Higher Education calls for the gradual elimination of branch campuses, with community colleges assuming the increased responsibility for the first two years of college education.

Two-year degrees may be earned in programs such as computer technology, executive secretary, and electronic technology which prepare the student for an employment career. Two-year degrees are also granted in fields such as chemistry and physics, and business, which may lead either directly to an employment career or to further study at a four-year college or university. Other two-year degree programs, such as teacher education, must be followed by further study at a four-year college or university before occupational preparation is complete.

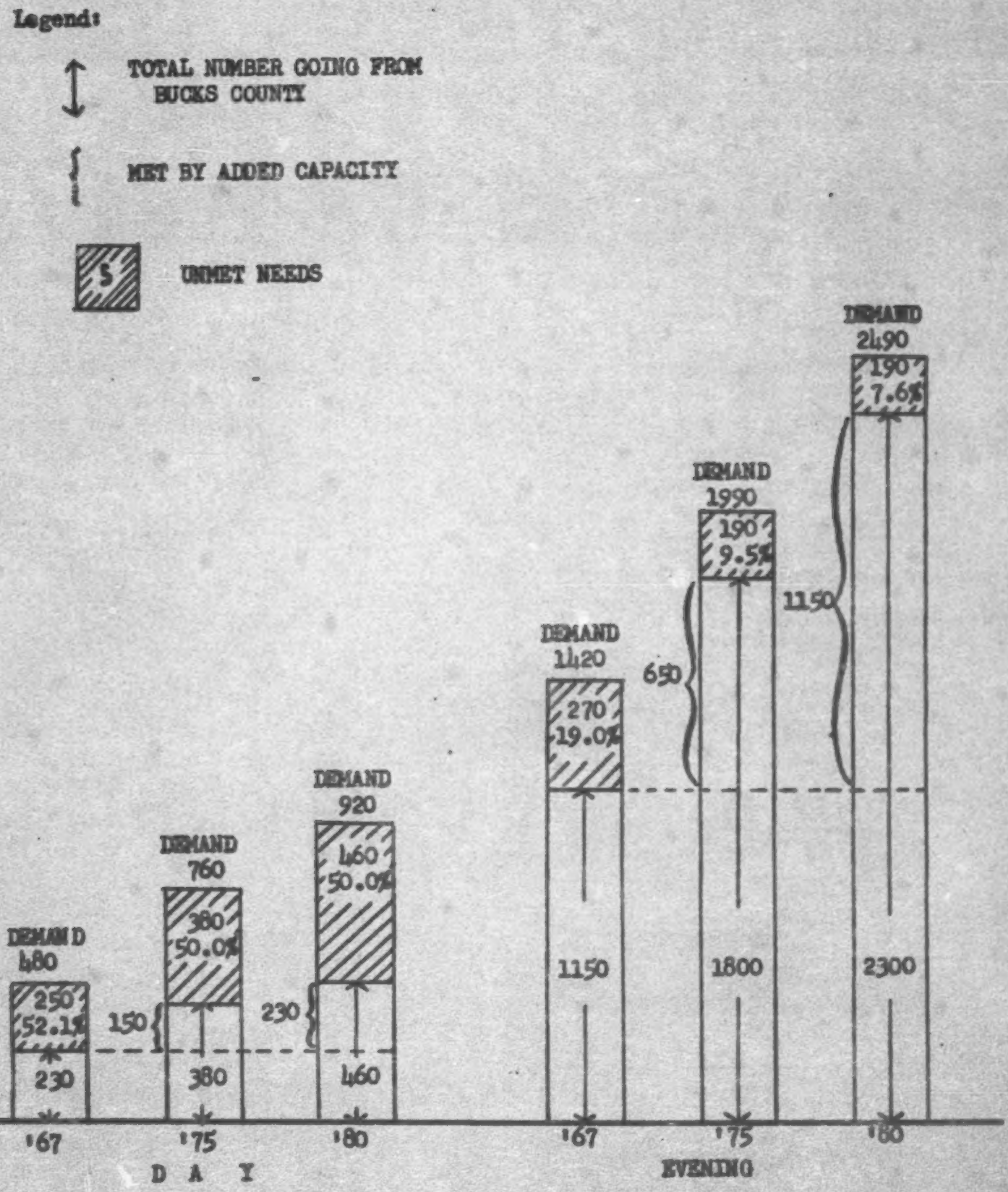
What is the extent of demands for these types of programs, and to what extent are the needs being met? How are these patterns likely to change by 1980?

Demand and Unmet Needs

As shown in Figure 8, total demand for two year degree programs is estimated at about 480 day enrollments in 1967 and about 920 day enrollments in 1980. Based on resources currently available and reported as planned in 1966-67, only about half the demand for day programs is likely to be met through 1980. There are greater demands for evening programs, amounting to about 1,420 in 1967 and increasing to an estimated 2,500 potential enrollments in 1980. About 20% of the evening need in 1967 is estimated to be unmet, declining to about eight percent in 1980, based on reported plans.

FIGURE 8

ESTIMATED DEMAND FOR PROGRAMS
2 YEAR AND TRANSFER



As Figure 8 shows, the additional planned capacity, which represents primarily the expansion plans of the Bucks County Community College, would meet a large part of the estimated increases in total demand. It should be noted that actual enrollment in the Community College in the 1967-68 year was about 300 students greater than had been planned for in the year 1966-67. Because the policy of the Community College is to accept all eligible students who apply from Bucks County, the plans of the College are far less limiting than those of other institutions which actually restrict enrollments to a pre-determined number. Thus the Community College can be expected to accept applicants above the number planned, and to meet needs to the extent students in fact apply to the College.

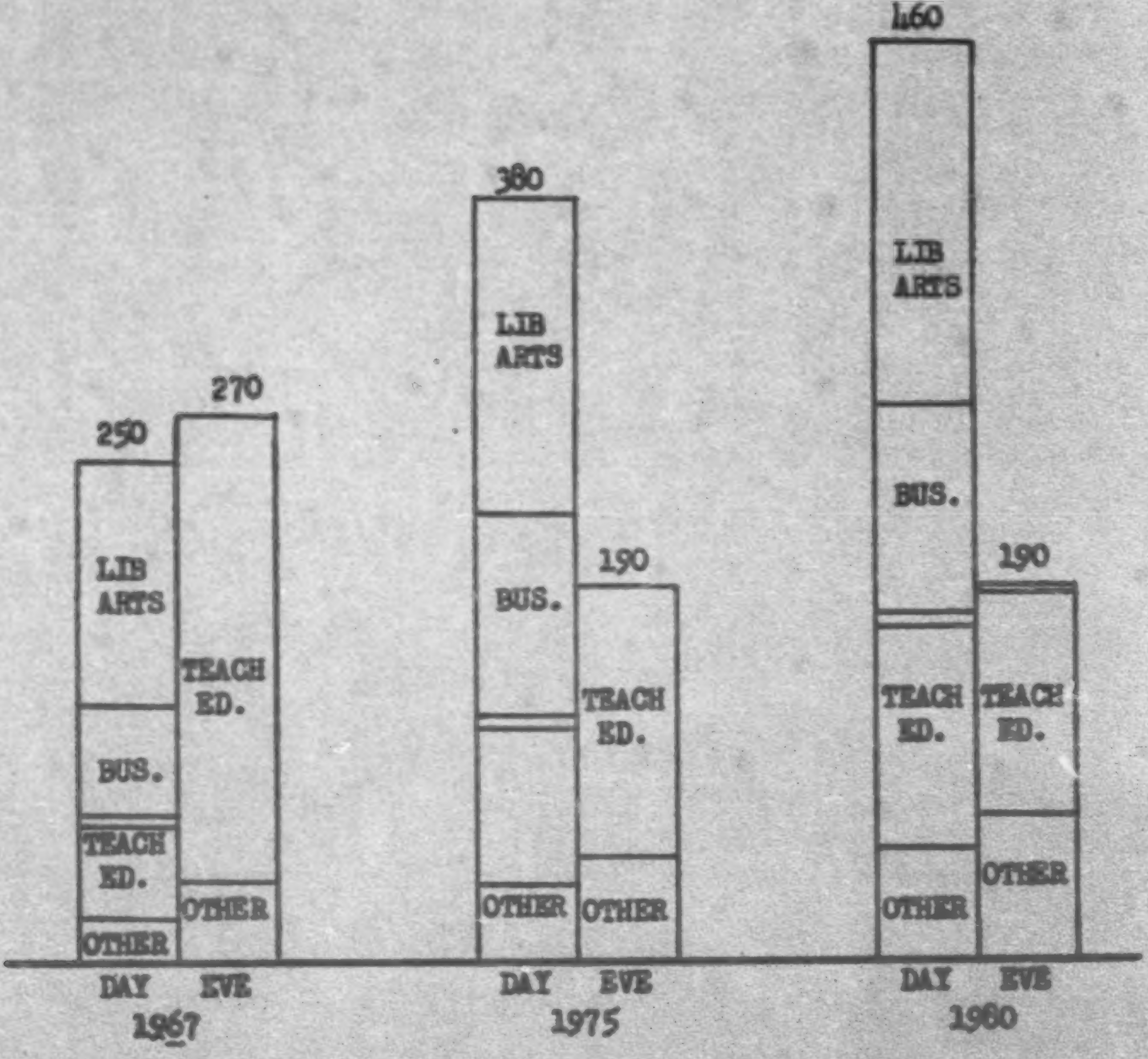
Given the ability and the willingness of the Community College to accept additional students, what factors contribute to the unmet needs shown in Figure 9? The largest part of the estimated unmet needs are types of programs --liberal arts, business, and teacher education--which are now offered by the Community College. Why do people with unmet needs not enroll in these programs?

FIGURE 9

2 YEAR AND TRANSFER PROGRAM UNMET NEEDS, BY DAY-EVENING, DESIRED SUBJECT

NOTE:

1. Subjects are shown in the following order;
    - Liberal Arts
    - Business
    - Engineering
    - Teacher Education
    - Nursing
    - Continuing Education
    - Agriculture
    - Misc. 2 Yr. Non Degree
    - Vocational-Technical
    - All Other
2. The subjects not identified fall in the blanks above, between, and below those identified.
3. One blank may indicate several subjects.



The major factor is likely to be the relative newness of the Community College, and the lag in knowledge by high school seniors and adults of the offerings, admission requirements, costs, and other aspects of the College. Since the Community College is not yet fully accredited--even though it is far along toward accreditation and its courses are accepted by many four-year universities--people may not realize that they can complete the first two years of college at the Community College and then transfer to a four-year college or university to complete a baccalaureate degree.

Graduating high school seniors, who account for the greatest part of potential full-time, day students, may also view the Community College as less prestigious than older institutions. Young women interested in teacher education, who account for the largest part of evening unmet needs, quite likely are not fully aware of the opportunities at the Community College. Those who graduated from high school before the College began operation in the fall of 1965 may not even be aware the Community College exists.

Conclusions and Recommendations

The size of unmet needs of graduating seniors and adults for two-year degree and transfer programs, which was estimated on the basis of 1966-67 plans of institutions, has been somewhat lessened in actual fact by the increased enrollments by the Community College in the 1967-68 year. Even so, further expansion of enrollment by the Community College will be needed to meet increasing demands in Bucks County. Enrollments, of course, can take place only if those with needs actually apply. Therefore, it is important that high school seniors and adults in Bucks County be made as fully aware as possible of the opportunities offered by the Community College. Part of this information and counseling aspect is treated further in the last section of this Chapter.

Recommendation 4.--The Community College should plan to increase its first year enrollment in degree programs (including transfer programs) from the 1966-67 level of about 829 to an enrollment capacity of about 2,300 day and evening students by 1980. At the same time increased publicity should be given to all opportunities at the Community College and special emphasis should be given to the opportunity to transfer to four-year institutions upon completion of the first two years at the Community College.

(The following recommendation, which is based on findings in the next section of this Chapter, is repeated here since it directly relates to the two-year degree and transfer programs of the Community College.)

Recommendation 5.--The Community College should explore the possibility of expanding program offerings in the areas of practical nursing, medical technology, and pre-registered nursing. Possible arrangements with hospitals and hospital schools of nursing should be investigated to determine means of increasing opportunities for meeting the requirements for registered nurse programs through cooperative arrangements.

Meeting Needs for Four-Year Degree Programs, 1967-1980

Four-year degree programs of colleges and universities provide the required education for an increasing number of occupational fields. The baccalaureate degree, in turn, is a pre-requisite for occupational preparation in many professional fields, including, law, medicine, and architecture, and is also a pre-requisite for graduate study in fields such as business administration, education (including college and university teaching), physics, public administration, engineering, etc. In addition, four-year college and university programs offer credit courses which are needed by people in many occupations to keep current with their fields or to gain advancement. Equally important, these programs provide the level of education which is often considered to be highly advantageous in allowing people to develop their personalities and capabilities quite apart from specific occupational preparation.

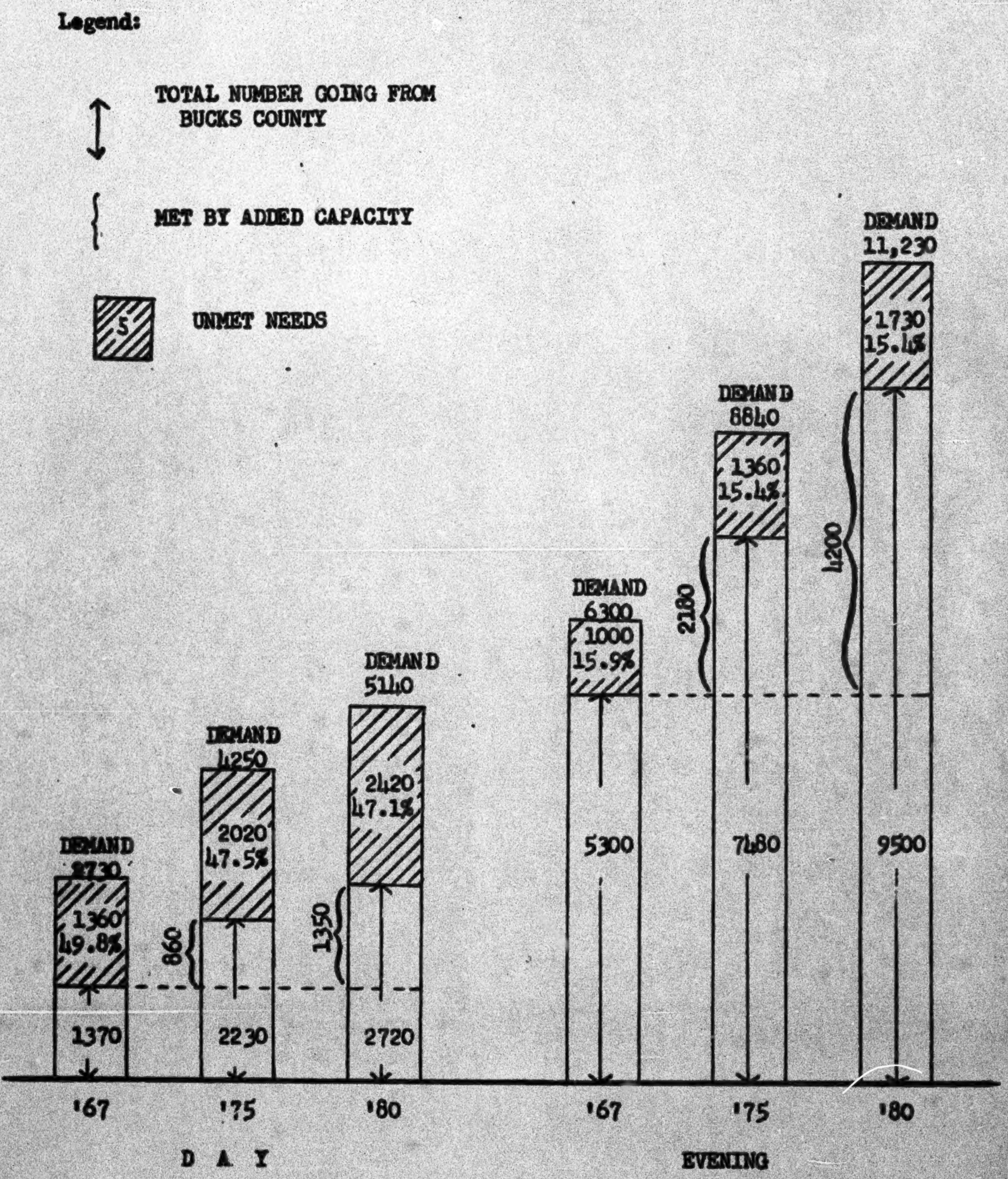
To what extent are residents of Bucks County seeking post high school education programs of the types offered by four-year institutions? How well are these needs being met at present, and what are the trends?

Demand and Unmet Needs

Figure 10 shows the estimated present and future pattern of total demand of graduating seniors and adults in Bucks County for programs offered by four-year institutions in and around Bucks County. Several factors should be kept in mind when interpreting these patterns. First, these estimates do not include an estimated one-fifth of graduating high school seniors entering colleges and universities across the nation as a matter of choice, and who thus are not considered a factor in local needs. Second, these estimates do include, as part of the adult component, high school graduates of recent years who were not able to gain admission to four-year institutions. Third, and last, part of the demand for evening programs is due to adults who have completed four or more years of college, and who want to take one or more credit courses to up-date their knowledge or to generally increase their knowledge. Thus the day demands are nearly entirely young people seeking first-year enrollment in full-time programs while the evening component includes those seeking courses beyond the first-year level, mainly on a part-time basis.

FIGURE 10

ESTIMATED DEMAND FOR 4 YEAR DEGREE PROGRAMS



As seen in Figure 10, present and planned programs within and around Bucks County are estimated to meet a much larger proportion of evening needs than day needs. This is due partly to the larger existing and planned resources for evening enrollment, and due partly to the more stringent entrance requirements in full-time day programs leading to a four-year degree. Further, the Delaware Valley College of Science and Agriculture is the only four-year institution in Bucks County offering full-time day programs, and its enrollment is drawn mainly from outside Bucks County in its day programs. At the same time, both Temple and Pennsylvania State Universities offer some degree-credit courses at continuing education centers in the public schools in Bucks County in the evening.

As a consequence of these factors, unmet needs for four-year degree courses in the evenings are estimated to remain at slightly under 16% through 1980, but because of expanding population the actual numbers of potential students whose needs are not met are estimated to increase from about 1,000 in 1967 to about 1,700 in 1980. Day unmet needs, however, are expected to decrease slightly in percentage by 1980, reducing from about 50% in 1967 to about 47% in 1980. Even so, the actual numbers of potential students whose needs are not met is estimated to increase from about 1,400 in 1967 to about 2,400 by 1980. This large increase in numbers is due mainly to the rapidly increasing numbers of graduating high school seniors, and the estimated graudal increase in the proportion of seniors who endeavor to go on to four-year degree institutions.

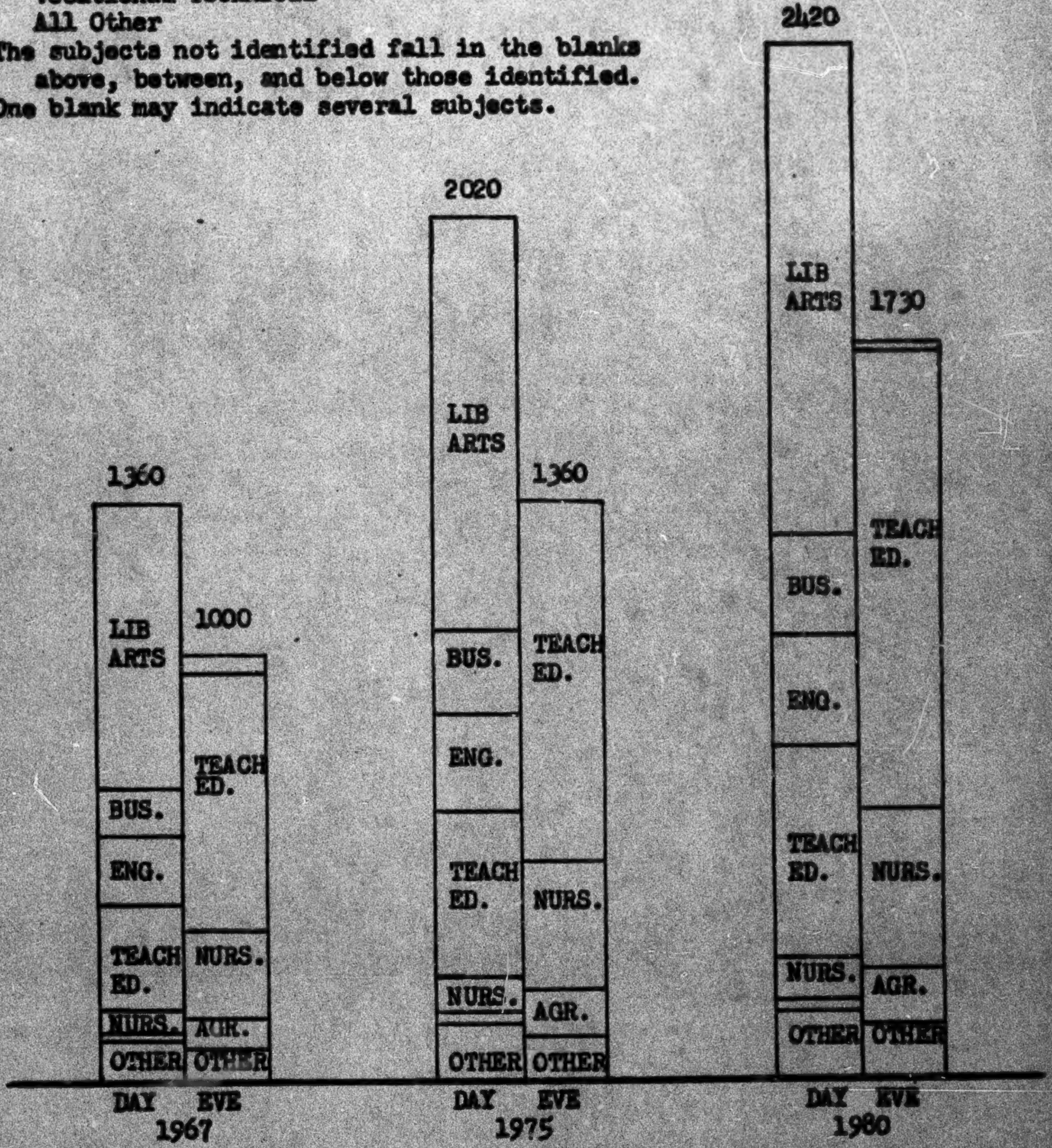
As shown in Figure 11, day unmet needs are concentrated in liberal arts (including science), business, engineering, teacher education, and nursing programs. These programs are also those of most interest to high school seniors who are successful in gaining admission to four-year college programs. Nursing programs, although a relatively small part of unmet day needs, are of particular interest since there are proportionately few opportunities in Bucks County (one hospital has a program) or the commuting area in nursing education. Yet there is a growing shortage of qualified nurses, medical technologists, and others in the health field.

FIGURE 11

4 YEAR DEGREE PROGRAM UNMET NEEDS, BY DAY-EVENING, DESIRED SUBJECT

NOTE:

1. Subjects are shown in the following order;
    - Liberal Arts
    - Business
    - Engineering
    - Teacher Education
    - Nursing
    - Continuing Education
    - Agriculture
    - Misc. 2 Yr. Non Degree
    - Vocational-Technical
    - All Other
2. The subjects not identified fall in the blanks above, between, and below those identified.
3. One blank may indicate several subjects.



In the evening, the largest unmet need by far is for teacher education programs, which represents primarily the large numbers of teachers in the public schools in Bucks County seeking to take credit courses needed for certification, to keep current with their field, and to work toward advanced specializations and degrees. Evening unmet needs for nursing and related programs mainly represent those who are not now in the field but want to prepare for nursing and related occupations on a part-time basis.

The presence of an evening unmet need in agriculture programs, although proportionately small, is due to the fact that the Delaware Valley College of Science and Agriculture is the only institution in Bucks County or in the commuting area which offers programs in agriculture, and offers these programs mainly in the day on a full-time basis.

Conclusions and Recommendations

What can be done to meet these needs for four-year degree and credit programs? Unlike two-year degree, transfer, and non-transfer programs of post high school education which have been considered up to this point, the responsibility for providing four-year opportunities is traditionally thought of as a responsibility of the State and of private institutions, not of localities. Thus the Pennsylvania statutes do not provide specific authority for counties to establish or operate four-year institutions. On the other hand, there is no specific prohibition against local establishment or operation of such institutions. But as a practical matter, the establishment of a four-year college is an expensive and long-term undertaking. Establishment of a university is even more difficult.

If results are to be achieved by 1980 or earlier, there is a far higher possibility of success by working with existing institutions rather than by endeavoring to bring about the establishment of a completely new four-year college or institution. The institutions presently operating programs within Bucks County, which could assist in meeting the estimated needs, include the Delaware Valley College of Science and Agriculture, Temple University and Pennsylvania State University which now operate continuing education programs, and the Bucks County Community College which provides first-year and second-year programs allowing transfer to four-year institutions.

The apparent growing unmet need for nursing and related programs could be met by the Community College through program expansions and cooperative arrangements with hospitals. The large estimated unmet need for evening programs in teacher education could be met by Temple University and Pennsylvania State University by increasing teacher education program offerings in their continuing education centers. But how can the unmet needs for full-time day programs be met?

It is not considered reasonable to simply say that the large and growing unmet need for four-year degree day programs is legally a responsibility of the State and of private institutions. Yet what can be done at the County level? In addition to the general recommendations contained in the next part of this Chapter, there are several possible courses of action.

The Community College could expand to accommodate an added 2,400 first-year students above the enrollment planned for 1980. Because of the large increases already recommended for non-transfer programs and two-year degree and transfer programs at the Community College, a further expansion of this magnitude should be considered after other possibilities have been explored.

Although the State Plan for Higher Education recommends against branch campuses of State supported universities, including Temple and Pennsylvania State Universities, there is still some possibility that either of these Universities might consider establishing a branch in Bucks County. The long-term growth prospects of the County, as well as its location, suggest that as a long-term strategy the County should seek to have a full-scale university, including graduate programs, located within the County. A campus of either of the two Universities mentioned could grow into such an institution. Given the existing and projected population distribution in the County, location of such an institution in Lower Bucks County would serve the largest proportion of residents.

Delaware Valley College of Science and Agriculture, located near Doylestown and already expanding its campus and programs, might expand further and institute a variety of day and evening programs for commuters. Its relatively high tuition costs might be lowered through seeking additional State support, or through tuition assistance provided by the County for residents attending the College.

Since four-year institutions, including those mentioned above, generally have relatively high admission requirements in terms of college entrance scores and class standing, and since they obtain students from throughout the metropolitan area and the nation, there would probably have to be some special incentive for them to give preferential admission to Bucks County residents for full-time degree programs.

One way in which an incentive could be provided would be through providing a site and initial facilities to one or more colleges or universities who would offer programs in the County and give preferential admission to County residents. Such a facility might be provided through a cooperative effort of business, the County schools, the County government, and private individuals. Graduate programs as well as those leading to a four-year degree might be made available at such a facility, assuming it included the necessary library and laboratory resources.

As can be seen from the foregoing discussion, there is no single easy method of meeting the needs for four-year degree programs. There are, however, a variety of approaches which can be acted upon which could meet most, or all of the growing unmet needs.

Recommendation 5.--The Community College should explore the possibility of expanding program offerings in the areas of practical nursing, medical technology, and pre-registered nursing. Possible arrangements with hospitals and hospital schools of nursing should be investigated to determine means of increasing opportunities for meeting the requirements for registered nurse programs through cooperative arrangements.

Recommendation 6.--Temple University and Pennsylvania State University continuing education centers in Bucks County should give special attention to increasing offerings in credit courses in the field of teacher education, and should consider increasing the number of locations in the County where these and other courses are offered in the evenings.

Recommendation 7.--The interest of the Delaware Valley College of Science and Agriculture in expanding the scope and scale of its programs should be explored thoroughly. The exploration should include the possibility of instituting a major day program for commuters, with program offerings in liberal arts, teacher education, engineering and business. The possibility of reducing tuition through increased State support or other means should be investigated. The scale of increase considered for first year enrollments should be at least half of the estimated unmet needs in 1980 of 2,400 day students and 1,700 evening students, which would be in addition to the currently projected 1980 enrollment of 500 day students and 480 evening students.

Recommendation 8.--Explorations should be conducted with Temple University and Pennsylvania State University as to their interest and ability to establish branches within Bucks County, preferably in the Lower Bucks area. These campuses should provide the full range of resident and commuting programs, including program offerings at the graduate level. The scale of first year enrollment considered should be at least half of the estimated unmet needs in 1980 of about 2,400 day students and 1,700 evening students.

Recommendation 9.--In view of the major future growth potential in Bucks County, the County should endeavor over the long term to have one or more full-scale universities locate within the County, which would include resources developed through implementation of Recommendations 7 and 8 above. Such a university would, of course, not depend mainly on Bucks County residents for enrollment, but would provide resources and economic advantages of major importance to the County as it continues to grow and develop.

Recommendation 10.--In conjunction with Recommendations 7 and 8, consideration should be given by business and industry, County schools, County governments and private individuals to the possibility of cooperating in providing a site and facilities at which one or more of these four-year colleges and universities could conduct complete four-year programs. The aspect of preferential admission to County residents should be taken into account in these explorations.

Recommendation 11.--If implementation of Recommendations 7, 8, 9, and 10 proves to be impossible, the Community College should then further increase its plans for expansion to a level capable of meeting the majority of the estimated unmet needs for first-year enrollments in four-year degree programs, totalling an estimated additional enrollment capacity of about 2,400 in day programs and about 1,700 in evening programs. In this event, consideration should be given to the possibility of a second campus as an alternative to the indicated level of added expansion at the present site.

Increasing Post High School Education Opportunities

In addition to the recommendations directed toward specific needs and specific types of programs, there are a number of ways in which post high school education opportunities for residents of Bucks County may be improved. These include improvements in information and counseling, provision of additional sources of funds, and more effective coordination of the variety and location of program offerings in the County.

Bucks County high school seniors would be more likely to be able to take advantage of post high school programs in and around Bucks County if it were possible to increase their motivation and improve their strategies. More intensified counseling might well increase the percentage of seniors who have definite plans for further education immediately following high school, and could lead to a higher percentage of placements in post high school institutions, including vocational, trade and industrial programs as well as college programs.

Both high school seniors and adults would benefit from better information about post high school opportunities in and around Bucks County, and adults would also benefit from any increases which might be made in the availability of counseling services of the public schools. In the case of adults, information might be made available through employers as well as through more general publicity and information services.

The opportunities of both high school seniors and adults could be increased by making available increased funds for individual education after high school. Employers might find it worthwhile to expand or initiate tuition assistance to employees who engage in post high school education. There is a possibility that State scholarship funds may be made available in the future to high school seniors who pursue programs at institutions which do not grant degrees.

It is evident that individual institutions which offer programs in Bucks County also could benefit from improved information about program offerings of other institutions, both present and planned, and could better conduct their own programs if there were a continuing means of communications. They would also benefit from improved means of providing information about program offerings to adults throughout the County as well as to graduating seniors--it is of little value to offer a program if prospective students do not find out about it and consequently do not enroll.

There is also the important question of how the recommendations of this study are to be carried out, how progress is to be reviewed, and how efforts of individual institutions are to be woven into a sensible pattern of response to the growing needs of Bucks County residents for post high school education.

It seems evident that there should be some continuing organization for improving post high school education opportunities in Bucks County. All the action that can and should be taken over the years is not likely to be accomplished solely by individual efforts without reference to the overall patterns of development. This need for a continuing point of information and cooperation could be met through establishing a continuing advisory group on post high school education, and by providing a small staff capability to assist in implementing recommendations of this study, and to act as a continuing channel of communications among those seeking post high school education and those offering post high school education.

Such an advisory group on post high school education would probably be most effective if it were relatively small and composed of opinion leaders in the County, including mass communications media membership. Rather than consider setting up a new organization for this special purpose, it would appear desirable to have the advisory group serve under the auspices of the County Board of School Directors, which is already concerned with many aspects of post high school education. The staff for the post high school education function might be assigned to the County Superintendent for administrative support and supervision, which would allow close coordination with efforts in the public schools related to improving post high school education opportunities.

Recommendation 12.--Counseling programs in the high schools in Bucks County should give special attention to making students aware of occupational opportunities as they actually exist in Bucks County, in the major surrounding metropolitan areas, and in the U. S. as a whole, and to post high school education appropriate to these occupations. Increased emphasis should be given to occupations which require post high school preparation other than four years of college, and to the educational opportunities available, both full-time and part-time. Students planning to enter degree-granting institutions should be encouraged to apply to several appropriate institutions, and should be made aware of both variations in costs and means of obtaining financial assistance. Counseling programs of the high schools and the Community College should also be made available to adults to the greatest degree possible.

Recommendation 13.--State scholarship funds should be made available to graduating high school seniors who pursue post high school education programs other than those conducted by institutions granting degrees. The State legislature and the Higher Education Assistance Agency (which grants State scholarships) should be made aware of the support of Bucks County for extension of scholarship funds to these additional types of post high school education.

Recommendation 14.--Employers who do not now provide either tuition assistance or other inducements for employees completing post high school education should consider the advantages of such efforts in terms of more capable employees, improved retention, employee development for future job requirements, and other benefits. The Industrial Development Council, chambers of commerce, and other business and commercial organizations should consider encouraging their membership to take such action. All employers in Bucks County should make a major effort to inform their employees of opportunities for part-time post high school education in and around Bucks County, and of organizational incentives offered to employees, such as promotions or pay increases, recognition awards, time off with pay, and tuition assistance.

Recommendation 15.--Employers in Bucks County should explore their individual and collective requirements for post high school education programs with both the high schools and with the other institutions offering post high school education programs in the County. Such explorations should include both specially sponsored programs and general employment prospects for students completing particular programs.

Recommendation 16.--The Bucks County Board of School Directors should consider establishing a continuing Advisory Council on Post High School Education, and appointment of a Post High School Education Coordinator on the staff of the County Superintendent of Schools. The Advisory Council and the Coordinator would assist the County Board and the County Superintendent in bringing about action to implement the recommendations of this study. The Advisory Council and the Coordinator would serve as a continuing point of contact and information for school districts, post high school education institutions, business and industry, and others interested in the conduct of post high school education in the County. The Coordinator should actively assist in setting up courses and programs in locations throughout the County, and should aid in providing information about post high school education to individuals seeking to further their educations.

Recommendation 17.--A comprehensive study of post high school education needs and resources, generally similar to the present study, should be conducted again when the results of the U. S. Census of 1970 become available. At that time, progress in implementing recommendations of the present study should be reviewed in terms of changing patterns of needs for post high school education and changing economic patterns. A major effort should be made to conduct the study on a cooperative basis, including the entire metropolitan region, which would allow more effective consideration of employment factors and would facilitate coordination of plans of institutions offering post high school education programs which are available to commuters.

APPENDIX A

ESTIMATE OF FUTURE POPULATION GROWTH
BY SCHOOL DISTRICT
Bucks County, Pennsylvania

Prepared for
Bucks County Board of School Directors

By
Government Studies Center
Fels Institute of Local and State Government
University of Pennsylvania

June, 1967

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INTRODUCTION

This report on prospective population development of Bucks County, Pennsylvania, is the first of a series of working papers prepared for Bucks County Board of School Directors to assist in the analysis of post high school educational needs in the County. The data here will be used in conjunction with sample survey results concerning the present desires and aspirations of the County's high school seniors and adults who may be interested in furthering their education beyond the high school level. The data will also be used to help make estimates of the costs and suitability of alternative methods of meeting the needs indicated in the sample survey results. It is anticipated that this planning effort will continue and that changing desires and aspirations will be combined with revised estimates of future growth periodically as additional information is revealed by the passage of time.

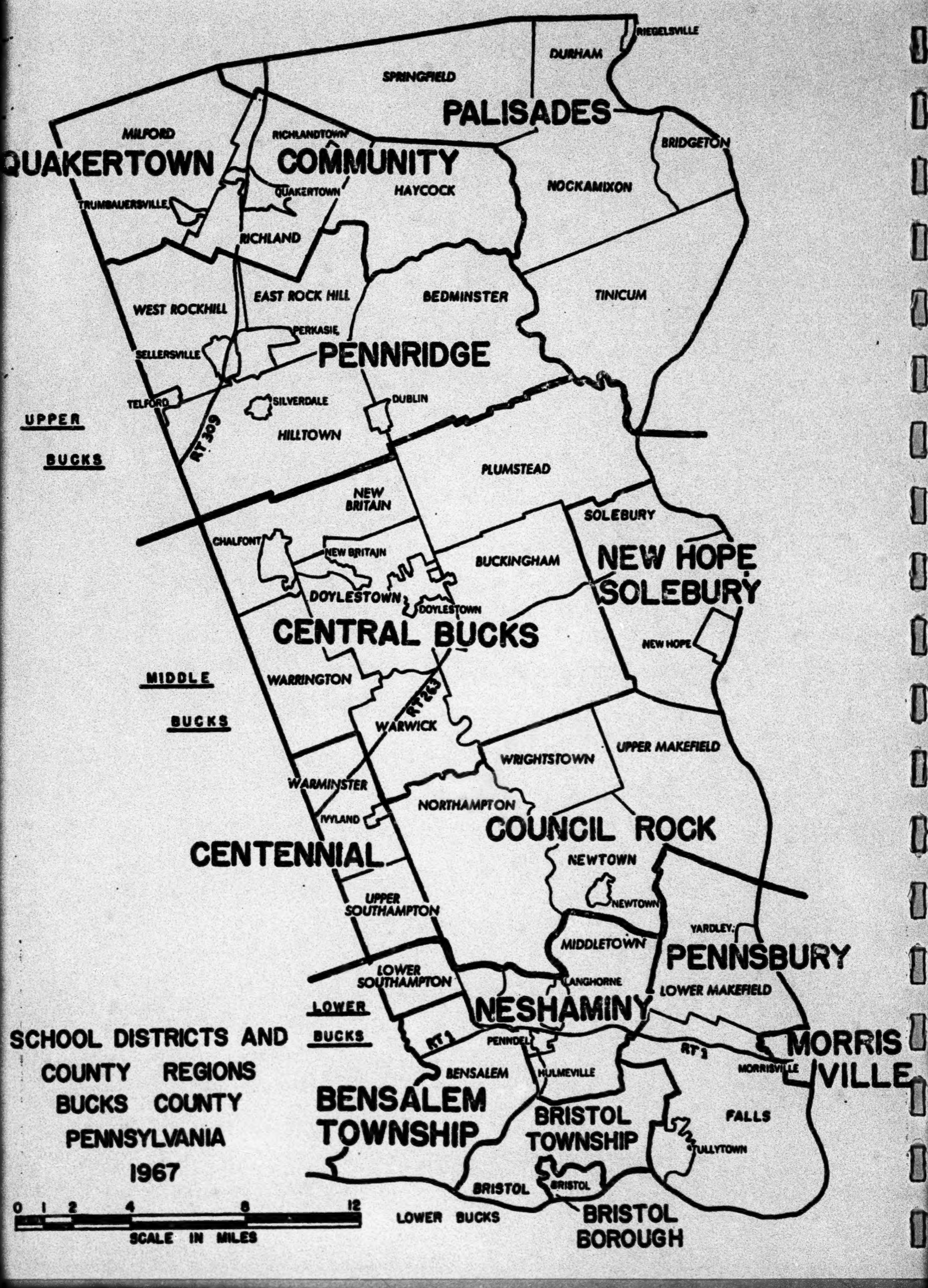
In the preparation of this study, the Government Studies Center of the Fels Institute of Local and State Government at the University of Pennsylvania has served as consultants to Bucks County Board of School directors. Government Studies Center Personnel participating in the development of this research are John K. Parker, Manager of Systems Division, project supervisor; Boyd Z. Palmer, in charge of research design, and Arnold R. Post, who has developed these estimates of the County's population growth.

SUMMARY OF EXPECTATIONS

It is estimated that Bucks County's population will increase to about 575,000 as of 1980 or by 85% as compared to 1960's population of 309,000. An acceleration in growth is expected in the 1970's, which will be relatively intense in Middle Bucks County.

Growth at the present time is less intensive than it was in the 1950's so that the present era is one of relative lull. The lull is associated with the present general shortage of young adults in the population, who were born in the 1930's. The more intensive stages of growth in the 1950's and in the 1970's and 1980's are associated with the two post war baby-booms, reflecting their maturity.

The geographic pattern is an extension of existing trends. In the 1950's, County development was most intensive along Route 1 between Trenton and Philadelphia in Lower Bucks. During the 1960's, active development has tended to move out along Old York Road through Montgomery County and on to the Townships bounded by the Neshaminy in Middle Bucks. In the latter part of the 1970's, land for additional residential development will become scarce in lower Bucks County; and the intensity of development will shift gradually towards the Bethlehem Pike by the 1980's and 1990's in Upper Bucks.



SCHOOL DISTRICTS AND COUNTY REGIONS BUCKS COUNTY PENNSYLVANIA 1967

RIEGELSVILLE
DURHAM
SPRINGFIELD
PALISADES
MILFORD
RICHLANDTOWN
QUAKERTOWN
COMMUNITY
BRIDGETON
QUAKERTOWN
HAYCOCK
NOCKAMIXON
TRUMBAUERSVILLE
RICHLAND
EAST ROCK HILL
BEDMINSTER
TINICUM
WEST ROCKHILL
PERKASIE
SELLERSVILLE
PENNRIDGE
TELFORD
SILVERDALE
DUBLIN
RT 309
HILLTOWN
UPPER
BUCKS
PLUMSTEAD
NEW BRITAIN
SOLEBURY
CHALFONT
NEW BRITAIN
BUCKINGHAM
NEW HOPE SOLEBURY
DOYLESTOWN
DOYLESTOWN
CENTRAL BUCKS
NEW HOPE
MIDDLE
BUCKS
WARRINGTON
RT 263
WARWICK
UPPER MAKEFIELD
WRIGHTSTOWN
WARMINSTER
NORTHAMPTON
IVYLAND
COUNCIL ROCK
CENTENNIAL
NEWTOWN
NEWTOWN
UPPER SOUTHAMPTON
YARDLEY
MIDDLETOWN
PENNSBURY
LOWER SOUTHAMPTON
LANGHORNE
LOWER MAKEFIELD
LOWER
BUCKS
NESHAMINY
RT 1
PENNDEL
RT 1
MORRISVILLE
MORRISVILLE
BENSALEM
HULMEVILLE
BENSALEM TOWNSHIP
BRISTOL TOWNSHIP
FALLS
TULLYTOWN
BRISTOL
BRISTOL
BRISTOL BOROUGH
LOWER BUCKS
0 1 2 4 8 12
SCALE IN MILES

Table I

Estimated Total Population 1960-1980

(Thousands)

Area	1960	1965	1970	1975	1980
Upper Bucks	47.2	51.9	56.4	64.7	74.2
Middle Bucks	70.4	91.5	104.2	137.2	177.5
Lower Bucks	191.2	202.7	232.7	274.3	322.8
County Total	308.8	346.1	393.3	476.2	574.5
School Districts:					
1. Palisades	9.3	10.2	10.8	11.4	12.1
2. Quakertown	16.4	17.2	18.6	21.3	24.0
3. Pennridge	21.5	24.5	27.0	32.0	38.1
4. Central Bucks	28.6	35.0	38.2	48.3	60.0
5. New Hope-Solebury	4.0	4.3	5.0	7.2	9.5
6. Council Rock	13.5	18.2	20.1	26.5	34.7
7. Centennial	24.3	34.0	40.9	55.2	73.3
8. Neshaminy	45.7	49.2	61.9	75.5	94.9
9. Pennsbury	42.5	47.6	53.8	65.0	78.0
10. Morrisville	7.8	9.6	9.4	8.9	8.5
11. Bristol Township	59.3	58.3	63.8	69.9	74.7
12. Bristol Borough	12.4	12.6	12.2	12.7	12.6
13. Bensalem	23.5	25.4	31.6	42.3	54.1

The figures in Table I represent preferred estimates which are related to expected trends in building development. The detailed tables (XIV and XV) indicate high and low estimates which, by 1980, have a range of about plus or minus 10% of these figures.

Overall, the County gained about 42,000 households in the 1950's, and it appears that the gain will be about 30,000 households in the 1960's. In the 1970's, with housing demand increasing rapidly and with less space for it in the central portions of the Metropolitan Area, accelerated development is in prospect for near-by areas which still have space available. The gain in households for the 1970's is assumed to be 60,000, which is equivalent to a full decade's development at the peak rate established in 1966 when 5,969 units were authorized. A major difference, however, is that, whereas 1966 saw authorization for many apartment units, single-family housing is expected to predominate again in the 1970's, as it did in the 1950's.

Tables II and III show estimates of senior class enrollments (in public and nonpublic school systems) and estimates of adults over 15 years of age and not enrolled in grades 1-12 for each of the school districts. To develop these estimates, estimates of the age distribution of the total County population were developed, as tabulated in the appendix, according to which estimates of County total senior class enrollments and adults over 15 were prepared. The estimates of these categories by school district were then derived in proportion to the estimates of district total populations. Again, preferred estimates are shown in the tables which follow.

The above methodology does not take into account differences in age distributions among the districts' populations; and it is assumed that the allowance for uncertainty in district totals is sufficient to provide an adequate range in the estimates of the seniors and the adults over 15. On the assumption that public senior enrollments in 1970 will amount to 90 percent of 1967's ninth grade enrollments as reported through the office of the County Superintendent of Schools, preliminary figures for the districts were examined to see that the minimum growth allowance was more than sufficient to accommodate such a condition. With the assistance now being given to potential high school dropouts coupled with the intense publicity placing a high economic value on a high school diploma, increases in holding power of the high schools are anticipated. In 1967, senior enrollment is about 80 percent of 1963-64's ninth grade enrollment in the public schools.

Table II

Estimate of Senior Class Enrollments

(Public and Private)

Area	1960	1965	1970	1975	1980
Upper Bucks	640	890	1,050	1,100	1,110
Middle Bucks	735	1,380	1,685	2,320	2,660
Lower Bucks	1,990	3,035	4,125	4,660	4,840
County Total	3,365	5,305	6,860	8,080	8,610
School Districts:					
1. Palisades	100	150	195	195	180
2. Quakertown	240	290	335	360	360
3. Pennridge	300	450	520	545	570
4. Central Bucks	300	525	570	810	900
5. New Hope-Solebury	40	65	90	120	140
6. Council Rock	150	280	375	450	520
7. Centennial	245	510	650	940	1,100
8. Neshaminy	455	735	1,070	1,280	1,420
9. Pennsbury	500	695	945	1,105	1,170
10. Morrisville	80	140	165	150	125
11. Bristol Township	595	895	1,170	1,190	1,125
12. Bristol Borough	125	190	230	215	190
13. Bensalem	235	380	545	720	810

Table III

Adults over 15 Not Enrolled in Grades 1-12

(Thousands)

Area	1960	1965	1970	1975	1980
Upper Bucks	27.9	31.1	34.4	40.1	46.1
Middle Bucks	41.6	54.9	63.6	85.2	111.8
Lower Bucks	112.9	121.7	141.9	170.1	203.3
County Total	182.4	207.7	239.9	295.4	361.2
School District:					
1. Palisades	5.5	6.1	6.6	7.1	7.6
2. Quakertown	9.7	10.3	11.3	13.2	15.1
3. Pennridge	12.7	14.7	16.5	19.8	23.4
4. Central Bucks	16.9	21.0	23.3	30.0	37.8
5. New Hope-Solebury	2.4	2.6	3.0	4.5	6.0
6. Council Rock	8.0	10.9	12.3	16.4	21.8
7. Centennial	14.3	20.4	25.0	34.3	46.2
8. Neshaminy	27.0	29.5	37.8	46.8	59.8
9. Pennsbury	25.1	28.6	32.8	40.3	49.2
10. Morrisville	4.6	5.8	5.7	5.5	5.4
11. Bristol Township	35.0	35.0	38.9	43.3	47.0
12. Bristol Borough	7.3	7.6	7.4	7.9	7.9
13. Bensalem	13.9	15.2	19.3	26.3	34.0

One of the constraints on a small area's population growth is the amount of land available for future residential development. Another is the intensity of residential development permitted by local regulations on this land. In 1959, the Bureau of Economic and Business Research of the School of Business and Public Administration at Temple University prepared an estimate of future population growth for Bucks County Planning Commission "Bucks County population estimates for the years 1965, 1980, 2010." Part of this study was devoted to an analysis of available land capacity as controlled by the zoning ordinances then in effect. These findings have been adopted in this study, at least, as an indication that the growth anticipated is feasible. There are three exceptions to this general statement. In Morrisville Borough, authorizations since 1960 have exceeded the capacity of the 1959 zoning ordinance; and allowance for 25 additional dwellings has been made arbitrarily. No allowance for apartment development is evident for Bristol Township in the 1959 study and apartment development has occurred there since 1960 at a significant level. The capacity in 1959 was for about 5,000 additional units; an expectation of 7,600 has been incorporated here. In the summary tables of the 1959 report, no indication was found of dwelling unit capacity in Newtown Township and an arbitrary allowance for 15,000 units has been made, comparable to the allowance indicated for Wrightstown Township.

It should be noted that dwelling unit capacity figures are dependent on a certain "faith in princes" yet to rule; and it is not uncommon for the capacities implied by early zoning ordinances to be lower than capacities allowed under later ordinances when patterns of development have become more clearly defined. It may also be noted that the 1959 estimates of total County growth and Metropolitan Area growth as of 1980 are in substantial agreement with the estimates developed for this study. A population of 5.8 million is expected in the Metropolitan Area in both cases. A County population of 558,000 is indicated for Bucks County in the Temple University Study, which is within the range of uncertainty about the estimate of 574,500 preferred as the result of this analysis. The County Planning Commission's current estimate for 1980 population is 539,650, also within the range of uncertainty given here but closer to its lower limit of 515,000.

Table IV

Utilization of Land Capacity 1960-1980

(Thousands of Dwellings)

Area	Available Capacity 1960 (1)	Housing Supply Increments 1960-64	Housing Supply Increments 1960-1980	Percent of Capacity Utilized	Capacity Remaining
Upper Bucks	126.0	2.0	11.0	7.8%	115.0
Middle Bucks	150.5	6.6	37.7	22.6%	112.8
Lower Bucks	59.1	5.7	50.3	95.0%	n.a(2)
County Total	335.6	14.3	99.0	30 %	n.a(2)
School Districts:					
1. Palisades	43.	.4	1.4	3 %	41.6
2. Quakertown	34.	.5	3.2	8 %	30.8
3. Pennridge	49.	1.1	6.4	12 %	42.6
4. Central Bucks	59.	2.0	11.1	17 %	47.9
5. New Hope-Solebury	6.5	.1	1.9	26 %	4.6
6. Council Rock	63.	1.4	7.5	9 %	55.5
7. Centennial	22.	3.1	17.2	71 %	4.8
8. Neshaminy	20.	1.6	17.0	82 %	3.0
9. Pennsbury	15.	1.8	13.5	81 %	1.5
10. Morrisville	0.5	.6	.7(2)	n.a(2)	n.a(2)
11. Bristol Township	5.	.6	7.6(2)	n.a(2)	n.a(2)
12. Bristol Borough	0.6	.2	.6	100	0
13. Bensalem	18.	.9	10.9	65 %	7.1

(1) School of Business and Public Administration, Temple University, 1959.

(2) n.a.: not available. Apartment development in Bristol Township and Morrisville Borough has made these 1959 Capacity figures obsolete.

The distribution of expected housing increments is shown in Table V both in absolute numbers and as a percentage of total County development.

Table V

Housing Increments, 1950-1980

(Thousands)

School District	Units 1950-60		Units 1960-70		Units 1970-80	
	Number	(%)	Number	(%)	Number	(%)
Palisades	490	1	700	2	700	1
Quakertown	980	2	1,100	3	2,100	3
Pennridge	1,340	3	2,200	6	4,200	6
Upper Bucks County	2,810	6	4,000	12	7,000	10
Central Bucks	2,720	6	3,300	10	7,800	12
New Hope-Solebury	370	1	400	1	1,500	2
Council Rock	1,770	4	2,300	7	5,200	8
Centennial	4,060	9	5,500	17	11,700	18
Middle Bucks	8,920	20	11,500	35	26,200	40
Neshaminy	8,570	19	6,000	18	11,000	17
Pennsbury	8,870	20	4,500	14	9,000	14
Morrisville	600	1	700	2	0	
Bristol Township	11,620	26	3,000	9	4,600	7
Bristol Borough	280	1	300	1	300	
Bensalem	3,300	7	3,000	9	7,900	12
Lower Bucks	33,240	74	17,500	53	32,800	50
County Total	44,970	100	33,000	100	66,000	100

METHODOLOGY

A Note on Method

This estimate of population growth by school district in Bucks County depends on a methodology which is still under development but is consistent with results produced by special censuses taken in Bucks County since 1960. The basic variable considered is the relative increase in households to be expected in the Metropolitan Area in the decades of the 1960's and 1970's. The principal hypotheses have to do with the statistical dependence of population growth on housing growth by small area. Research based on all the municipal areas in the Philadelphia Standard Metropolitan Statistical Area outside of Philadelphia proper has revealed a reasonably simple relation which was very accurate between 1950 and 1960. Continuing research indicates that the form of this relation may be stable and that its coefficients may be predictable according to variations in rates of household increase.

Customary analysis considers three components of population: 1) an initial population, 2) the natural increase or surplus of births over deaths associated with that population, and 3) a net migratory increase. In this study, the analysis concerns itself with two components: 1) initial population and 2) marginal increase per household. In neither analysis, is it possible to make a count of people or houses and assign the individuals uniquely to the analytical categories. A person moved away or a house demolished is replacable by any (rather than some particular) person moving in or house newly built; and one must deal in both cases, with patterns and equivalents rather than the fate of individuals.

The methodology here employed is thought to mark an improvement over customary methods. Houses are simpler to anticipate than people primarily because they are precisely located, for the most part, in a permanent fashion, and they are not self generating.

In addition, there are fewer analytic categories to deal with, and the results conform well with other findings.

HOUSING vs. POPULATION

People need housing, but the economy is exacting enough so that builders cannot supply housing in careless abundance. Under conditions of adequate economic development, which are assumed, an existing housing supply will not become overcrowded; however, as new families emerge from the old housing supply, their choice of where next to live will be restricted to areas where housing is available to them. Although individual builders will make some mistakes in estimating prospective demand for the houses they build, the industry as a whole will not persist in providing houses in areas where builders' expectations are not realized and actual new housing goes unwanted.

A given five year age group will use its largest number of housing units when it is 45-49 years old. Past that age, increases in the death rate will more than make up for increases in the household headship rate. The table below indicates approximately how many household heads (or households) are to be expected from an age group numbering 1,000 at age 15-19 and it will be noted that almost 95 percent of the peak demand is exerted when the age group is 30-34 years old. The estimates are based upon average survival rates and average percentages of household headship.

Table VI

Prospective housing demand of 1,000 15-19 year olds

		Housing units	Increase	Percent of Maximum
First demand	(15-19)	10	10	2%
-after 5 years	(20-24)	200	190	45%
-after 10 years	(25-29)	369	169	83%
-after 15 years	(30-34)	416	47	94%
-after 20 years	(35-39)	434	28	98%
-after 25 years	(40-44)	444	10	100%
-after 30 years	(45-49)	445	1	100%
-after 35 years	(50-54)	431	-14	97%
-after 40 years	(55-59)	399	-32	90%
-after 100 years		0	-399	0%

A population, of course, consists of people of all ages. It is clear from the above, however, that periods of rapid housing increase will coincide with periods when relatively large numbers of people are in their twenties and early thirties. For this reason, more persons are to be expected per added household in decades when households are being added rapidly than when net household increase is slow.

The age distribution of the United States population is very irregular and that of the Metropolitan Area is also irregular. These irregulatities now have a long history dating back to the 1920's when large scale immigration to the country was brought to a halt and the baby-boom of that time created a high potential for housing demand in the 1950's. The low birth rates of the 1930's were partly due to the depression but also to the absence of young adult immigrants. Although there has been nothing comparable to the Great Depression since World War II, the scarcity of young adults in the 1960's has been sufficient to lower the rate of housing development and to induce an echo of the low birth rates of the 1930's, an echo which has perhaps been amplified by the development of new means of family planning.

The baby-boom following the second world war persisted until about 1960; and those born at the beginning of the period will enter the traditional house-buying age-groups in 1971 and thereafter. The last of them will not leave these age groups until about 1995. In the latter part of the 1970's, the house-buying age groups will still be growing so that record levels of single family housing construction may well be expected in suburban areas. The alternative would be misery. Variations in the decennial rates of household increase can thus be anticipated with a good degree of confidence. After the present lull, the number of householders will increase more rapidly during the 1970's.

In the 1950's, households in the Metropolitan Area increased by about 24 percent. Housing construction so far in the present decade indicates a likely gain of about 19 or 20 percent; and a growth rate of 23 percent is anticipated in the 1970's. Since the provision of additional housing is becoming more and more of a suburban phenomenon, the impact of heightened building activity will be greater in suburban areas. In the 1950's, about 42,000 additional families took residence in Bucks County; and it seems likely, with the decade now two-thirds gone, that the County's increase will total about 30,000 families for the 1960's. An estimate of 60,000 additional householders in the County for the 1970's seems within the realm of likelihood.

On this basis, it is estimated that the County's population in 1980 will be about 575,000, a figure in substantial agreement with Delaware Valley Council's estimate of 611,000 for 1985 and in the upper part of the range of 442,400 to 671,500 estimated in 1959 for the County Planning Commission by Temple University's School of Business and Public Administration.

Small Area Considerations

Census tracts are small areas having an average population of about five or six thousand persons. They are defined by the Bureau of the Census to coincide with municipal boundaries. There are 86 census tracts in Bucks County which may be combined to conform with the boundaries of the County's 54 municipalities. On the basis of actual changes reported for the decade of the 1950's, 1960 census tract populations may be estimated in proportion to the size of their 1950 populations and to their changes in housing supply or households. In the estimating equation below, $^{P}60$ stands for a tract's 1960 household population, $^{P}50$ is the household population for the tract in 1950 and (dX) indicates the change in the number of occupied dwellings or households:

$$^{P}60 = .88\ ^{P}50 + 4.1\ (dX) - 15$$

In 95 percent of the metropolitan area's 427 census tracts outside of Philadelphia, such estimates are accurate to within 350 persons and the coefficient of multiple correlation is better than 99 percent, overall. The above formula applied to data for Bucks County as a whole yields an estimate of 303,100 persons in the County's households as of 1960. The reported figure was 304,900, for an error of 1,800 persons, or about 0.6 percent.

Research based on national census returns since 1910 yields an indication that the comparable relationships appropriate for household growth rates of 20 and 23 percent, as estimated for the metropolitan area in the 1960's and 1970's, are consistent with the following formula:

$$^{P}70 = .97\ ^{P}60 + 2.80\ (dX)$$

$$^{P}80 = .91\ ^{P}70 + 3.75\ (dX)$$

Short Time Considerations

In order to estimate population growth over a part of a decade adjustment of the estimating formulas has to be made. The coefficient of initial population (.88 in the formula for 1960 populations) clearly is time dependent. If it were employed to estimate a 1961 population based on a 1960 census report, it would imply a decimation of the population as if the census takers had carried the plague. The coefficient should be very close to 100 percent for any estimate applying to a year after the most recent count. Assuming a steady rate for the emergence of population out of the census year housing supply, one can adjust the coefficient by taking the n/10th root of the value expected for ten years later, i.e. for 1965 the ½ root or square root of .970 would be appropriate.

The coefficient of persons per added dwelling also should also be adjusted; and a linear interpolation between the decennial values (4.1 and 2.8) for the 1960's produces the following correspondence with the special censuses that have been taken in the County since 1960 as shown in the table below.

Table VII

Comparison of special census reports with populations estimated on the basis of building permit reports and 1960 census reports.

Year of Census	Municipality	Population		Error		Estimating Coefficient	
		Census	Estimate	No.	%	P_{60}	(dX)
1963	Northhampton Twp.	8,462	8,355	107	1.3%	.991	3.71
1964	Falls Township	31,152	32,060	-908	-2.8%	.988	3.58
	Lower Makefield Township	10,635	10,520	115	1.1%		
	Warminster Twp.	24,116	23,210	906	3.9%		
	Warrington Twp.	4,907	4,825	82	1.7%		
1965	L. Southampton Township	14,603	15,260	-657	4.3%	.985	3.45
1966	Northampton Twp.	11,369	9,900	1469	14.9%	.982	3.32
	Solebury Twp.	3,066	3,420	-334	-9.8%		
	U. Southampton Township	11,494	10,690	804	7.5%		
Total		119,824	118,240	1584	1.3%		

With the exception of Northampton Township (1966), the errors of estimate are tolerable. Although the overall bias of 1.3 percent is small it will be noted that the percentage errors are noticeably larger at the end of the period. It is possible to adjust the estimating equation for the decade to correspond more accurately with the special census results and this has been done although there is some danger in this procedure since the communities seeking special census are anything but a random sample of all the municipalities in the County. Since there is no advantage to having a special census taken unless a population increase is thereby estiblished, special census are a characteristic of intensively developing areas. It would also be possible to adjust the estimate of dwellings added to secure an improvement in correspondence; however, this information is more highly pertinent to the situation in the County than the general considerations based on analysis of the national census returns since 1910. In short, it seems more reasonable to depart from theory with respect to the national returns although the pairing of the coefficients is based on this research. The estimating equation for 1970 population has therefore been adjusted to conform with the special census returns and reads as follows:

$$P_{70} = .90\,P_{60} + 3.85\,(dX)$$

Table VIII

Errors of Estimate, 1963-1966

Special Census year and municipality	Population				Estimating Coefficient	
	Reported	Estimated	Error	% error	P60	(dX)
1963						
Northampton Township	8,462	8,440	22	0.26	.97	4.025
1964						
Falls Township	31,152	31,620	-468	-1.48	.958	4.000
Lower Makefield Twp.	10,635	10,510	125	1.19		
Warminster Township	24,116	23,570	546	2.32		
Warrington Township	4,907	4,790	117	2.44		
1965						
Lower Southampton Twp.	14,603	15,210	-607	-3.99	.947	3.975
1966						
Northampton Township	11,369	10,400	969	9.32	.938	3.950
Solebury Township	3,086	3,380	-294	-8.69		
Upper Southampton Twp.	11,494	10,790	704	6.52		
Total	119,824	118,710	1,114	0.94		

The adjustment has reduced the overall bias to less than one percent and the absolute value of the percentage deviations has become a more simple and less variable function of time. The difference in estimating equations affects the distribution of estimated population in the County more than it does the estimate of total County population. The original formula leads to an estimate of 341,000 for the County's 1965 population and 384,000 for 1970. The revised formula leads to estimates of 346,100 and 393,500, respectively.

Stability and Growth

These relations have certain important implications regarding the nature of patterns of development in small areas. The most striking, perhaps, is that in periods of rapid housing development, small areas which don't receive their "share" of development, will tend to lose population; while areas receiving more than their "share" will tend to grow more rapidly than the general County average of 3.4 persons per dwelling might indicate. As new houses are built and occupied, some of the population moving into them moves out of the old housing supply. The more rapidly new housing is occupied, the greater will be the proportion of population moving out of the old housing to take advantage of it and the younger will be this population so that, over the course of a decade, with children and all, the greater will be the number of persons per added dwelling.

The relative growth of the housing supply, however, has to be judged on a regional basis. If many houses are added to the supply of a particular township, they will bring in relatively fewer people if household development is generally slow in the region. It is likely that in times of relatively slow growth, the units added are more apt to be apartments than single family units, as has been the case over the past several years.

It is also to be observed, that even though 12,000 units were added to the 84,000 units already in Bucks County between 1960 and 1964, the trend in school enrollments which was implied by the 1960 Census report has scarcely been altered for the County as a whole. The gain in enrollments 1960-65 can be quite adequately explained by the large number of 0-4 year old county residents counted in 1960. Immigration to one district has been offset by outmigration from another. Even six thousand units added in the 1950's would have made a substantial difference in the school enrollment trend. The school enrollment trends referred to include public and private school reports, at the elementary level.

It is an open question whether there is any such thing as a purely local trend in the development of a small area's population. The population growth of a small area appears to depend not only on the growth of its own housing supply but also on the provision of housing in many, many other small areas. It is also worth noting that the relation derived from the 1950 and 1960 data applied very uniformly by small area where the small areas comprised a region of roughly 50 mile radius and included slums, suburbs and farmlands with diverse racial and economic characteristics. The formula did not apply particularly well to some 25 of the 427 census tracts studied though it did apply well to areas ranging in population from 142 on the riverfront in the City of Chester, where a net loss was registered, to nearly 60,000 (Bristol Township).

There is also an implication for communities, large and small, which have reached the geographical limits of their potential housing development. Such communities stand to lose population in the next succeeding period of generally rapid housing growth simply for lack of additional building space within their own boundaries, though the rate of loss will depend on the rate of new development elsewhere. To illustrate, it is reasonable to expect that present housing construction in Middle Bucks County is attracting some population flow from Lower Bucks to Middle Bucks, even though Lower Bucks is still undergoing development at this time.

The population expected in the Metropolitan Area, in Philadelphia and in Bucks County as of 1970 is shown in the table below as compared with the reported populations for 1950 and 1960. It will be noted that the Metropolitan Area total has been gaining fairly steadily while the two Counties have shown separate surges, Bucks County in the 1950's and Philadelphia County in the 1960's. These patterns of growth are implicit in the estimating equations employed. The coefficient of initial population is of primary importance in areas with large population while the coefficient of added households is of primary importance where changes in the housing supply are of greater importance.

Table IX

Regional Population Growth

	PSMSA*		Philadelphia County		Bucks County	
Year	Population	% decade increase	Population	% increase	Population	% increase
1950	3,671,000	15%	2,072,000	7%	145,000	35%
1960	4,342,000	18%	2,003,000	-3%	309,000	113%
1970	4,930,000	14%	2,091,000	+4%	393,300	27%

*Philadelphia Standard Metropolitan Statistical Area.

As long as Philadelphia represents an important source of population for the suburban counties growth, it is reasonable to expect the rates of gain for the two classes of counties to be out of phase. It is worth noting that the 1965 estimate of population for the Metropolitan area by this method comes to 4,604,000 as compared to a Census Bureau estimate of 4,667,000, a difference of about 1.5%.

Application of Method to Bucks County

In order to use this method of population estimation, it is necessary to develop information on the growth of households in each small area. These data are not reported directly; however, in Bucks County, all municipalities except for the rural townships in Upper Bucks County report to the State Department of Labor and Industry the number of dwelling units authorized by building permit each month. In the rural Townships, it is required that subdivision plans be submitted to the County Planning Commission which keeps a record of the number of lots in approved subdivisions. These are the sources of information that have been used in this analysis.

Between 1950 and 1960, change in the number of dwelling units correlated positively with size of the 1960 household population, the correlation being higher between these variables than between the 1950 and 1960 populations themselves. During the 1950's the reports of the Department of Labor and Industry indicate that 61 percent of the State's gain in dwelling units (as reported by the Census) was reported as authorized units by a variable set of municipalities which had 64 percent of the State's population in 1960. From this, it is assumed that reports to the State may have an accuracy of 95 percent, and this estimate of accuracy has been applied to the reports from Bucks County municipalities since 1960. For the northern rural Townships, a rough and ready comparison of subdivision activity and dwelling unit authorizations has led to the rule of thumb that housing supply growth is 1.5 times the number of lots reported in approved subdivisions.

Gains in total housing supply tend to exceed gains in occupied housing. In the metropolitan area the gain in occupied dwellings was 88 percent of the gain in total dwellings between 1950 and 1960. In the suburban Counties the percentage was about 95%, while in Philadelphia, the percentage was only 63%. Since 1960 in Bucks County, it has been assumed to be 90 percent.

These figures taken in conjunction with the 1960 Census reports provide the information necessary to make current estimates of population for the County's municipalities.

SCHOOL ENROLLMENTS

It has been noted that the addition of some 12,000 housing units to the County's housing supply from 1960 to 1964 hasn't made much difference to the school enrollment trend since 1960. The preschoolers of 1960 were sufficient to account for the reported gains. This observation is based on the following analysis.

Table X

Enrollment Growth, Grades 1-12 1960, and 1965, Actual, and Estimated under Conditions of no Migration, Bucks County

1960 Age Groups	Population	Percent Enrolled	Enrollment 1960	Survivors 1965	Percent Enrolled	Enrollment 1965
0-4	42,834	0	0	43,700	75%	32,800
5-9	38,616	75%	29,000	38,400	98%	37,600
10-14	30,365	98%	29,750	29,750	72%	21,400
15-19	19,218	72%	13,850	19,150	2%	380
20-24	13,402	2%	270	13,300	0%	0
Total enrollment:						
	Estimated		72,870			92,180
	Actual (U.S. Census)		71,773	(School reports)		89,662

The above estimating percentages are derived from a cross tabulation published by the Census for the State as a whole indicating school enrollment by single grade and age distribution by single year. The enrollment shown for 1959-60 is that reported by the Census for Bucks County and is slightly higher than the comparable figure reported by the schools surveyed for this study. It is likely that some County residents attend schools not in the County, which would explain the difference. The increase shown over the five years in the youngest cohort (0-4, 1960) takes some account of census underenumeration of small children. The declines in the other cohorts are attributable to deaths. No allowance has been made for migration. The narrow difference between estimate and report for 1964-65 indicates that little allowance should be made for net migration in the school age groups at the county level.

The major trend 1960-65 in school enrollments has had to do with aging of the resident population. A matter of considerable secondary importance is an indicated attrition of enrollments in the parochial school system. Between 1964 and 1965, enrollments in 2nd to 8th grades numbered about 1,100 pupils fewer than the preceding year's enrollments in 1st to 7th grades.

Parochial school enrollment data have not been made available past the academic year 1964-65 and only the county total is available, not the distribution by public school district. (Parochial school districts don't coincide with public school districts.) In addition demographic analysis of each school district would require an undue effort relative to the other work which has to be done in this study. However, by comparing the 1st, 2nd, and 3rd grade enrollments in the public schools for 1961-62 with the 6th, 7th, and 8th grade enrollments for 1966-67, one can obtain an impressionistic picture of the likely trends of migration within the County over the past five years. In a stable situation some small attrition is to be expected.

Table XI
Public School Enrollments, 1962 and 1967

		Enrollment, 1962 Grades 1, 2, and 3	Enrollment, 1967 Grades 6, 7, and 8	Gain 10% or more
1.	Palisades	411	434	
2.	Quakertown Community	923	910	
3.	Pennridge	1,261	1,276	
4.	Central Bucks	1,664	1,992	20%
5.	New Hope-Solebury	201	193	
6.	Council Rock	891	1,222	37%
7.	Centennial	1,653	2,039	23%
8.	Neshaminy	2,439	2,821	16%
9.	Pennsbury	2,531	2,763	
10.	Morrisville	285	321	12%
11.	Bristol Township	3,490	3,224	
12.	Bristol Borough	422	449	
13.	Bensalem Township	917	1,035	13%
	Total	17,088	18,679	9%

Districts gaining noticeably faster than the County average may be assumed to be experiencing some in-migration. The nature of migratory experience in the other districts is not established by this analysis; small gains may indicate transfers from the private school systems while small losses may be explained by the death rate.

The population enrolled in school lies in the age group 5 to 34. To estimate the number of adults over 16 not enrolled in the grades, reference was made to the state cross-tabulations referred to above to determine percentages which might be applied to the estimated age distributions of Bucks County's population. The resulting estimates of County total were then prorated among the school districts according to district population estimates. Estimated age distribution for the county are shown in the appendix. Adults, 16 years and over, not enrolled in the grades range between 59 and 62 percent of the counties population on a rising trend. The trend in senior class enrollments as a percentage of county population is tabulated below.

Table XII
High School Seniors as
Percent of County Population

Year	Percent
1960	1.0%
1965	1.5%
1967	1.6%
1970	1.8%
1975	1.7%
1980	1.5%

UNCERTAINTY

The County's total population as of 1980 has been estimated at 575,000 plus or minus 60,000, roughly 10 percent of the total or 30% of the increment between 1970-1980. A range of 10,000 is warranted on the basis of statistical reasoning assuming the stated increase in households proves true and that the estimating equations are actually the most efficient that could be chosen. It will not be possible to ascertain the actual truth of these assumptions until after the 1980 Census is published. If the equations are valid, the range in uncertainty about the population translates to a range of uncertainty in household growth. An average of 6,000 additional households per year has been assumed for the 1970's. A range of plus or minus 1,600 new households a year (about 27 percent of the increment) would account for the range in population, assuming the 1970 estimate is reasonably accurate. The estimate for 1970 is 393,500 which relates to a current (1967) estimate of about 380,000.

It will be noted that even the 1965 figures are given within a range of uncertainty; the preferred estimate here is for 346,100 plus or minus about 10,000, though the extreme values are thought to be unlikely. In 1965, the Government Consulting Service published an estimate of current County population equaling 347,000 persons; however, this estimate was only of peripheral interest and was made without reference to school enrollment trends. Other ex post facto estimates of the County's population are presented below.

Table XIII

Estimates of Bucks County Population

	1964	1965
U.S. Census Bureau	322,000	345,000 (provisional)
State Planning Board	323,800	327,500 (provisional)
County Planning Commission	n.a	356,850

In 1965 and 1966, 10,500 dwellings were authorized by building permit, and 750 more are estimated to be in Townships not reporting building permit data, yielding an estimate of 11,800 new units overall or 10,600 new households in the past two years, which account for the estimated gain of 37,000 persons since 1965. In the first quarter of 1967, reported building permit authorizations for the County were down by more than 50 percent as compared to the first quarter last year, 534 as compared to 1,101. The estimate for 1970 allows for the occupancy of approximately 7,000 more units by 1970.

The range of uncertainty has not been applied symetrically in the various parts of the County. It has been assumed that if the preferred estimate turns out to be low, the errors will tend to be most important in Middle Bucks County. In other words, unexpected growth seems most likely in this part of the County. On the other hand, if the preferred estimate turns out to be high, it seems most likely that unexpected stability will occur in the heavily populated area of Lower Bucks County and in the rural areas of Upper Bucks.

Table XIV

ESTIMATES OF TOTAL POPULATION, ADULTS, AND SENIORS

	Total Population			Adults 16+			Seniors		
Year	Low	Preferred	High	Low	Preferred	High	Low	Preferred	High
1960		308.8			182.4			3.265	
1965	330.4	346.1	360.2	198.8	207.7	216.2	5.060	5.305	5.545
1970	363.0	393.3	417.6	221.5	239.9	254.7	6.420	6.860	7.320
1975	445.5	476.2	515.4	273.7	295.4	217.8	7.500	8.080	8.675
1980	515.6	574.5	634.1	324.6	361.2	399.2	7.715	8.610	9.575

Table XV

Estimates of Population, Adults 16 and over not enrolled in Grades 1-12, and Senior class enrollments, by County region 1960 to 1980 by Five year intervals

Year and Area	Total Population			Adults			Seniors		
	Low	Preferred	High	Low	Preferred	High	Low	Preferred	High
Upper Bucks									
1960		47,200			27.900			540	
1965	48,600	51,900	54,100	29,100	31,100	32,400	815	890	970
1970	49,900	56,400	61,200	30,400	34,400	37,300	970	1,050	1,150
1975	57,900	64,700	71,500	35,900	40,100	44,400	985	1,100	1,215
1980	68,000	74,200	79,700	42,800	46,100	50,200	990	1,110	1,200
Middle Bucks									
1960		70,400			41,600			735	
1965	86,300	91,500	97,000	51,700	54,900	58,200	1,295	1,380	1,450
1970	94,400	104,200	113,200	57,700	63,600	69,100	1,515	1,685	1,810
1975	129,300	137,200	154,100	80,100	85,200	95,500	2,200	2,320	2,620
1980	154,300	177,500	217,100	97,200	111,800	136,500	2,320	2,660	3,310
Lower Bucks									
1960		191,200			112,900			1,990	
1965	195,500	202,700	209,100	118,000	121,700	125,600	2,950	3,035	3,125
1970	218,700	232,700	243,200	133,400	141,900	148,300	3,935	4,125	4,360
1975	258,300	274,300	286,800	157,700	170,100	177,900	4,315	4,660	4,840
1980	293,300	322,800	337,300	184,600	203,300	212,500	4,405	4,840	5,065

Table XVI

Estimates of Population, Adults 16 and over and not enrolled in grades 1-12, and Senior class enrollments, by School District 1960-1980 by Five year intervals

District Year	Total Population Low	Total Population Preferred	Total Population High	Adults Low	Adults Preferred	Adults High	Seniors Low	Seniors Preferred	Seniors High
Palisades									
1960		9,300			5,500			100	
1965	9,300	10,200	11,000	5,600	6,100	6,600	140	150	165
1970	9,100	10,800	12,500	5,600	6,600	7,600	165	195	225
1975	9,300	11,400	13,500	5,800	7,100	8,400	160	195	230
1980	10,000	12,100	13,800	6,300	7,600	8,700	150	180	210
Quakertown									
1960		16,400			9,700			240	
1965	16,400	17,200	18,200	9,800	10,300	10,900	275	290	305
1970	16,800	18,600	20,500	10,200	11,300	12,500	305	335	375
1975	19,000	21,300	23,500	11,800	13,200	14,600	325	360	400
1980	22,000	24,000	25,900	13,800	15,100	16,300	330	360	390
Pennridge									
1960		21,500			12,700			300	
1965	22,900	24,500	24,900	13,700	14,700	14,900	400	450	500
1970	24,000	27,000	28,200	14,600	16,500	17,200	500	520	550
1975	29,500	32,000	34,500	16,300	19,800	21,400	500	545	585
1980	36,000	38,100	40,000	22,700	23,400	25,200	510	570	600
Central Bucks									
1960		28,600			16,900			300	
1965	32,000	35,000	36,200	19,200	21,000	21,700	480	525	540
1970	35,700	38,200	40,100	21,800	23,300	24,500	550	570	600
1975	45,000	48,300	54,000	28,200	30,000	33,400	775	810	920
1980	51,800	60,000	65,000	32,600	37,800	40,800	780	900	975
New Hope - Solebury									
1960		4,000			2,400			40	
1965	3,700	4,300	4,700	2,200	2,600	2,800	55	65	70
1970	3,900	5,000	5,900	2,400	3,000	3,600	70	90	105
1975	6,000	2,200	12,400	3,700	4,500	7,700	105	120	210
1980	8,500	9,500	19,500	5,400	6,000	12,300	130	140	330

Table XVI (cont'd)

District Year	Total Population			Adults			Seniors		
	Low	Preferred	High	Low	Preferred	High	Low	Preferred	High
Council Rock									
1960		13,500			8,000			150	
1965	17,900	18,200	19,800	10,700	10,900	11,900	270	280	295
1970	19,100	20,100	22,500	11,700	12,300	13,700	345	375	405
1975	24,400	26,500	30,000	15,100	16,400	19,000	415	450	520
1980	27,300	34,700	52,100	17,200	21,800	32,800	410	520	780
Centennial									
1960		24,300			14,300			245	
1965	32,700	34,000	36,300	19,600	20,400	21,800	490	510	545
1970	35,700	40,900	44,700	21,800	25,000	27,300	550	650	700
1975	53,300	55,200	57,100	33,100	34,300	35,400	905	940	970
1980	66,700	73,300	80,500	42,000	46,200	50,600	1,000	1,100	1,225
Neshaminy									
1960		45,700			27,000			455	
1965	47,800	49,200	50,400	28,700	29,500	30,200	720	735	760
1970	56,900	61,900	64,000	34,700	37,800	39,000	1,025	1,070	1,150
1975	69,500	75,500	78,500	43,100	46,800	48,800	1,180	1,280	1,350
1980	86,300	94,900	98,500	54,400	59,800	62,000	1,295	1,420	1,475
Pennsbury									
1960		42,500			25,100			500	
1965	45,300	47,600	49,000	27,200	28,600	29,400	680	695	715
1970	50,300	53,800	55,500	30,700	32,800	33,900	905	945	980
1975	59,400	65,000	67,600	36,800	40,300	41,800	1,010	1,105	1,150
1980	70,000	78,000	81,000	44,600	49,200	51,000	1,050	1,170	1,220
Morrisville									
1960		7,800			4,600			80	
1965	8,000	9,600	9,600	4,800	5,500	5,800	120	140	145
1970	8,400	9,400	10,000	5,100	5,700	6,100	150	165	180
1975	8,000	8,900	9,800	5,000	5,500	6,100	135	150	165
1980	7,500	8,500	9,500	4,700	5,400	6,000	115	125	145
Bristol Township									
1960		59,300			35,000			595	
1965	58,700	58,300	60,700	35,200	35,500	36,400	880	895	910
1970	62,900	63,800	67,100	38,400	38,900	40,900	1,130	1,170	1,205
1975	66,300	69,900	72,500	41,200	43,300	45,000	1,130	1,190	1,230
1980	66,700	74,700	77,700	41,900	47,000	49,000	1,000	1,125	1,165

Table XVI (cont'd)

District Year	Total Population Low	Total Population Preferred	Total Population High	Adults Low	Adults Preferred	Adults High	Seniors Low	Seniors Preferred	Seniors High
Bristol Borough									
1960		12,400			7,300			125	
1965	12,100	12,600	13,200	7,300	7,600	7,900	180	190	200
1970	11,600	12,200	13,600	7,100	7,400	8.300	210	230	245
1975	11,200	12,700	14,200	7,000	7,900	8,800	190	215	240
1980	10,900	12,600	14,300	6,900	7,900	9,000	165	190	215
Bensalem									
1960		23.5			13,900			235	
1965	24,600	25,400	26.2	14,800	15,200	15,700	370	380	395
1970	28.600	31.600	33,000	17,400	19,300	20,100	515	545	600
1975	39,400	42,300	44,200	24,600	26,300	27,400	670	720	750
1980	51,900	54,100	56,300	32,100	34,000	35,500	780	810	845

APPENDIX TABLES

A - Age Distributions, Bucks County, 1950, 1960, 1970, 1980
(Thousands)

Age Group	1950	1960	1970	1980
0-4	15.3	42.8	39.5	64.5
5-9	13.2	38.6	43.2	57.4
10-14	10.1	30.4	48.0	53.6
15-19	9.4	19.2	39.9	48.4
20-24	10.0	13.4	26.4	50.2
25-29	12.2	19.9	21.0	49.0
30-34	12.4	26.5	16.9	43.8
35-39	11.2	27.5	24.3	35.2
40-44	9.8	22.8	30.7	25.6
45-49	8.2	17.2	28.6	29.4
50-54	7.6	13.0	23.2	32.3
55-59	7.1	10.0	16.3	28.1
60-64	5.9	8.3	11.2	21.8
65 on	12.0	18.9	24.1	35.2
Total	144.6	308.5	393.3	574.5

B. Dwelling Units, 1950, 1960 and as Authorized, 1960-67, Bucks County

	Dwelling Units(1)	
	Occupied	Total
1950	89,483	44,331
1960	83,327	89,483
Increase	42,613	45,152
Increase as Percent of total	94.4	100
Annual Average increase	4,261	4,515

	Authorized Dwellings(2)
1960	1,693
1961	1,940
1962	2,068
1963	2,349
1964	3,843
Subtotal	11,893
1965	4,567
1966	5,969
1967 (4 months)	724
Total	23,153
Subtotal (1960-66)	22,429
Annual Average 1960-66	3,210

1) U. S. Census of Population and Housing, 1950 and 1960.
2) Pennsylvania Department of Labor and Industry, Building Operations in Pennsylvania, monthly reports and annual summaries, 1960 to April 1967.

C. Approved Lots - Bucks County Planning Commission Final Review, 1960-66

	1960	1961	1962	1963	1964	1965	1966
Bedminster Township	66	30	18	17	9	7	30
Bridgeton Township	-	-	-	-	4	14	21
Durham Township	6	6	-	-	-	-	-
E. Rockhill Township	-	12	6	7	31	7	32
Haycock Township	8	11	-	-	15	18	22
Hilltown Township	37	69	54	47	74	83	43
Milford Township	7	-	-	23	5	19	43
Nockamixon Township	5	4	-	7	74	6	16
Plumstead Township	59	80	39	13	20	15	28
Richland Township	11	3	2	47	4	-	20
Springfield Township	10	38	8	-	-	42	21
W. Rockhill Township	-	12	14	41	30	10	19

Source: Bucks County Planning Commission

APPENDIX B

EMPLOYMENT AND EDUCATION
IN
BUCKS COUNTY, PENNSYLVANIA

Working Paper Number 2

Prepared for
Bucks County Board of School Directors

By
Government Studies Center
Fels Institute of Local and
  State Government
University of Pennsylvania

August, 1967

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EMPLOYMENT AND EDUCATION

INTRODUCTION

This report on Employment and Education in Bucks County, Pennsylvania, is the second in a series of working papers prepared for the Bucks County Board of School Directors to assist in the analysis of post high school educational needs in the county. The first working paper estimated future population growth by school district in Bucks County; others will be issued discussing educational resources, high school senior educational desires and plans, resident adults educational desires and plans, and probable unmet needs for post high school education. The data and results will be used to help generate and evaluate several alternative methods of meeting the unmet needs estimated by the research studies summarized in the working papers.

The Government Studies Center of the Fels Institute of Local and State Government at the University of Pennsylvania is serving as consultant to the Bucks County Board of School Directors, and has primary responsibility for the overall project. Government Studies Center personnel participating in this portion of the project are John K. Parker, project supervisor; Boyd Z. Palmer, in charge of research design; and Robert R. Cantine, author of this report.

PURPOSE AND SCOPE

Industry is both a demand on, and resource for, the education of people beyond high school. The purpose of this report is to describe and assess the direction of this demand and the degree to which industry is an educational resource. This involves a description and assessment of the direction of occupational trends, of industry growth, and educational attainment.

The scope for this report was established in the design phase of the overall project as (1) trends in employment and educational requirements in the United States, (2) employment trends in the metropolitan areas of Philadelphia, Trenton, and Allentown-Bethlehem-Easton (3) the employment market in Bucks County, and (4) specific data on employment and educational requirements of the larger Bucks County employers.

METHODOLOGY

Secondary data sources were used to provide a description of employment patterns, industry growth patterns, and occupation-education attainment patterns in the United States. Most of these sources were also used to provide employment and industry data for the three metropolitan areas. The effort was somewhat restricted, however, due to the lack of unmet source data for the metropolitan areas and Bucks County and in this respect the desired picture is lacking. Rather than utilize projection methods which would oversimplify, or perhaps even mislead, the analysis the only projections used are those available for the United States. A major effort to provide detailed manpower and employment projections was not made, since the primary purpose of the post high school education's study was to examine the inputs to education, rather than the outputs.

As a supplement to provide a useful description of industry and employment in Bucks County, questionnaires were mailed to 65 employers in Bucks County with over 200 employees. The basic list used to identify manufacturing industries in Bucks County was the Directory of Manufacturing Industries in Bucks County, Pennsylvania - 1966-1967, published by the Bucks County Industrial Development Corporation.

In an effort to cover the larger non-manufacturing establishments, a check was made of the Bureau of Employment Security list of non-manufacturing employers, covered by the unemployment insurance program, who had 200 or more employees in Bucks County. There were 11 such employers.

In addition, telephone lists and supplemental information at the Bureau of Employment Security office were used to locate non-covered, non-manufacturing employers with over 200 employees. Four additional employers were located (see the list of employers in Appendix B).

It should be pointed out in the beginning that the survey of employers was not designed to provide a representative sample of all industry in Bucks County. An arbitrary figure of 200 employees was set as the lower limit for an establishment to be included in the survey. This was considered a reasonable starting point to analyze employers from the standpoint of their demand on, and contribution to, the educational process. Any generalizations beyond this segment of employers would have to be cautiously made.

Of the 65 survey questionnaires sent out, 12 went to government agencies, one to a non-profit corporation (hospital), 41 to manufacturing industries, and the remaining 11 went to non-manufacturing employers. Of these, 11 of the government agency questionnaires were completed, 27 of the manufacturing industries questionnaires were completed, and 2 non-manufacturing industry questionnaires were completed. As a result of this response pattern most of what is reported and analyzed in this report from the survey involves government and manufacturing industry employment.

EMPLOYMENT

Although a person never truly discontinues his "education" in a broad sense of the word, once he discontinues the full-time pursuit of his formal education the seeking of gainful employment is the normal pattern. Once gainfully employed he may be encouraged by technological change, or may choose of his own interest, to continue his education. The choice to continue his education may result from many reasons, including self satisfaction, improved employment opportunity, maintaining the level of employment he now holds or updating his own bank of skills. The educational problem, therefore, is to analyze and judge these industry employment patterns, occupational employment patterns, and occupational-educational attainment patterns as the three dimensions which determine the employment-education interaction.

As a starting point Table I represents employment by industry division, 1960-1965 for the United States as a whole.

The table points to some obvious facts. First, of the total civilian employment, manufacturing employment is the largest of any of the industry divisions. However, in terms of percentage change in employment it fell below almost all other industry divisions, particularly government, service industries, and wholesale-retail trade, during the 1960-65 period.

TABLE I

Actual and Projected Employment, by Industry Division, 1960 to 1975 (1)

[Numbers in thousands]

Industry division	Actual				Projected		Change, 1960-65		Change, 1965-75	
	1960		1965		1975					
	Number	%	Number	%	Number	%	Number	%	Number	%
Agriculture	5,723		4,585		3,705		-1,138	-19.9	-880	-19.2
Total nonagricultural wage and salary workers [1]	54,234	100.0	60,770	100.0	75,875	100.0	6,536	12.1	15,105	24.9
Goods-producing industries	[illegible]	37.6	21,845	35.9	24,150	32.3	1,452	7.1	2,305	[illegible]
Mining	712	1.3	[illegible]	1.0	[illegible]	.8	[illegible]	[illegible]	[illegible]	-1.9
Contract construction	2,885	5.3	3,181	5.2	4,190	5.5	296	10.3	[illegible]	31.7
Manufacturing	16,796	31.0	18,062	29.7	19,730	26.0	1,266	7.4	[illegible]	[illegible]
Durable goods	9,459	17.4	[illegible]	17.1	11,460	15.1	[illegible]	9.9	[illegible]	[illegible]
Nondurable goods	7,336	13.5	7,685	12.6	8,260	10.9	[illegible]	4.5	[illegible]	7.8
Service-producing industries	33,840	62.4	38,924	64.1	51,345	67.7	5,084	15.0	[illegible]	31.9
Transportation and public utilities	4,004	7.4	[illegible]	6.6	[illegible]	6.0	[illegible]	.7	[illegible]	12.1
Transportation	[illegible]	4.7	[illegible]	4.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17.5
Communication	[illegible]	1.6	[illegible]	1.4	[illegible]	1.2	[illegible]	[illegible]	[illegible]	8.1
Electric, gas, and sanitary services	[illegible]	1.1	[illegible]	1.0	[illegible]	.8	[illegible]	1.6	[illegible]	[illegible]
Wholesale and retail trade	11,391	21.0	[illegible]	20.8	16,115	21.2	[illegible]	11.3	[illegible]	27.1
Wholesale	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Retail	[illegible]	15.5	[illegible]	15.4	[illegible]	15.6	[illegible]	11.7	[illegible]	27.0
Finance, insurance, and real estate	[illegible]	4.9	[illegible]	5.0	[illegible]	4.9	[illegible]	[illegible]	[illegible]	[illegible]
Service and miscellaneous	[illegible]	13.7	[illegible]	15.0	[illegible]	17.1	[illegible]	[illegible]	[illegible]	[illegible]
Government	[illegible]	15.4	[illegible]	16.6	[illegible]	18.5	[illegible]	[illegible]	[illegible]	[illegible]
Federal [2]	2,270	4.2	2,378	3.9	[illegible]	3.5	108	4.8	[illegible]	[illegible]
State and local	6,083	11.2	7,723	12.7	11,400	15.0	1,640	27.0	3,677	47.6

In fact, only the service industry employment expanded faster than the state and local sector of government, reflecting to a large extent the employment rise of people in the fields of education, and health services.[2] Of all the industry divisions only farming, mining, and transportation industry divisions experienced declines in employment.

The projections assume a 3% unemployment rate in 1975, and on this basis civilian employment by industry division reflects some very sharp changes in employment growth. Manufacturing industries still remain the largest employers but more significant employment gains are expected in the government and service industries. While employment expands by an estimated 1,688,000 in manufacturing industries, government employment is expected to increase by 3,944,000 and the wholesale-retail trade employment by 3,852,000. Strong gains are also expected in the contract construction industry (1,009,000) and transportation industry (542,000) leaving only the mining industry and agriculture facing a decline of employment over the next 10 years. These are all new jobs that will be needed in addition to the continued hiring of replacements.

The second important consideration is how the surrounding metropolitan areas and Bucks County compare with the industry division employment in the United States as a whole. Table II sets forth this comparison.

TABLE II

WAGE AND SALARY EMPLOYMENT IN THREE LABOR MARKET AREAS, BUCKS COUNTY, AND THE UNITED STATES, 1965

	United States[3]		Philadelphia[4]		A.B.E.*[5]		Bucks County[6]		Trenton[7]	
	No.	%	No.	%	No.	%	No.	%	No.	%
Mining	632,000	1.00	1,400	0.09	500	0.23	315	0.33	100	0.08
Contract Construction	3,181,000	5.00	74,800	4.65	7,600	3.77	3,464	4.12	4,800	4.02
Manufacturing	18,032,000	27.59	547,900	34.05	102,200	50.72	41,890	49.84	42,000	35.15
Trans. and Public Utilities	4,031,000	6.16	108,000	6.71	10,600	5.26	1,836	2.18	6,200	5.19
Wholesale - Retail	12,683,000	19.40	320,000	19.89	31,100	15.43	15,279	18.18	19,400	16.43
Finance-Insurance-Real Estate	3,019,000	5.00	87,800	5.46	5,600	2.78	1,817	2.16	4,400	3.68
Service Miscellaneous	9,098,000	14.00	243,800	15.15	23,600	11.71	8,084	9.62	20,700	17.32
Government	10,091,000	15.40	203,600	12.65	6,300	8.09	11,000**	13.09	21,900	18.32
Agriculture	4,585,000	7.00	21,700	1.35	4,000	1.99	373	0.44	NA	NA
TOTALS	65,355,000	100.55	1,609,000	100.00	201,500	99.98	84,058	100.0	119,500	99.99

* A.B.E. = Allentown-Bethlehem Easton

** Estimated

NA = Not Applicable

The table makes clear that manufacturing industry plays a much larger employment role in the Philadelphia, Allentown-Bethlehem-Easton, Trenton and Bucks County areas than it does in the United States as a whole. The figures also reflect the influence of state government on the employment in the Trenton metropolitan area as well as the characteristic concentration of transportation and public utility industries in the urban centers rather than the suburban area.

With these exceptions the three metropolitan areas and Bucks County exhibited a not too different industry employment pattern from that of the United States in 1965.

However, even though this similar pattern did exist for the year 1965 there are many reasons for caution in attempting to use United States employment growth rates to achieve a projected industry employment. Even the most common element among the three metropolitan areas, high manufacturing employment, exhibited such different growth characteristics from 1955-1965 that it is difficult to assume the United States growth pattern for each of the metropolitan areas and Bucks County.

Figure 1. Comparative Changes in Manufacturing Wage and Salary Employment in Three Labor Market Areas, Bucks County, and the United States

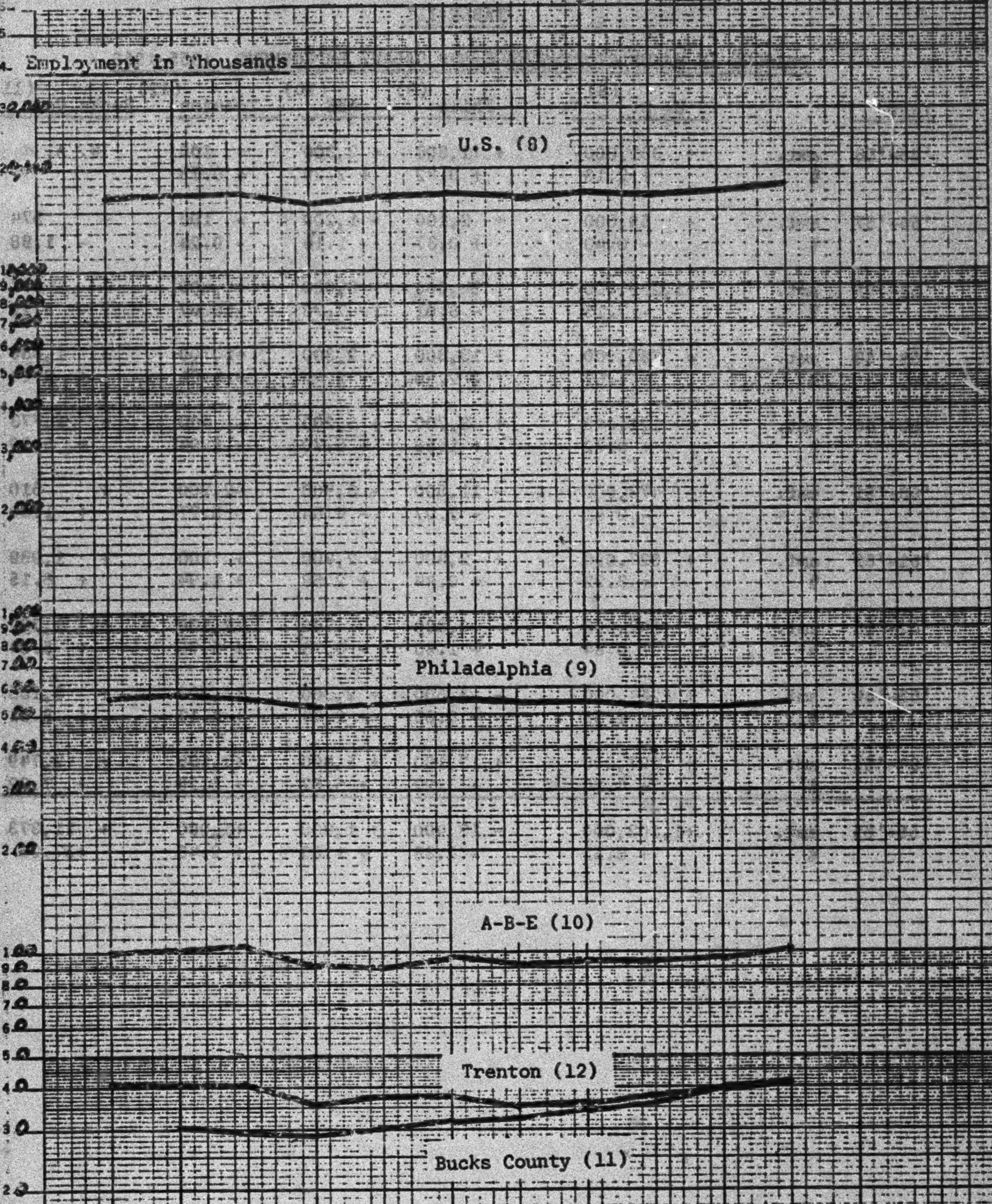

TABLE III

CHANGES IN MANUFACTURING WAGE AND SALARY EMPLOYMENT, 1955-1965

Year		U. S.(8)	Phila.(9)	ABE(10)	Trenton(12)	Bucks Co.(11)
'55-'56	amt.	+ 361,000	+ 1,800	+ 2,300	+ 300	N. A.
	%	+ 2.13	+ 0.32	+ 2.29	+ 0.73	
'56-'57	amt.	- 69,000	+ 2,100	- 1,200	- 100	- 574
	%	- 0.40	+ 0.37	- 1.16	- 0.24	- 1.88
'57-'58	amt.	-1,229,000	- 34,000	- 8,000	-4,400	- 967
	%	- 7.15	- 6.01	- 7.78	-10.67	- 3.22
'58-'59	amt.	+ 730,000	+ 13,300	- 2,300	+1,700	+ 1,056
	%	+ 4.57	+ 2.50	- 2.46	+ 4.61	+ 3.64
'59-'60	amt.	+ 121,000	+ 8,700	+ 5,200	- 400	+ 1,773
	%	+ 0.72	+ 1.59	+ 5.70	- 1.04	+ 5.90
'60-'61	amt.	- 473,000	- 11,500	- 3,900	-2,200	+ 510
	%	- 2.81	- 2.07	- 4.04	- 5.77	+ 1.60
'61-'62	amt.	+ 527,000	+ 2,400	+ 2,400	+ 700	+ 1,989
	%	+ 3.22	+ 0.44	+ 2.59	+ 1.94	+ 6.15
'62-'63	amt.	+ 142,000	- 9,800	- 700	+2,100	+ 1,732
	%	+ 0.84	- 1.80	- 0.73	+ 5.76	+ 5.04
'63-'64	amt.	+ 264,000	- 3,500	+ 2,300	+1,200	+ 3,105
	%	+ 1.55	- 0.65	+ 2.44	+ 3.10	+ 8.61
'64-'65	amt.	+ 727,000	+ 17,100	+ 5,800	+2,100	+ 2,749
	%	+ 4.20	+ 3.22	+ 5.67	+ 5.26	+ 7.02
'55-'65	amt.	+1,102,000	- 13,400	+ 1,900	+1,000	+ 11,373
	%	+ 6.52	- 2.38	+ 1.89	+ 2.43	+37.26

The yearly employment change data shown in Table III (taken from total employment data presented graphically in Figure I) reveals the extent of differences in employment growth among the areas. For example, all of the areas except Bucks County experienced a decline in manufacturing employment in 1961, the greatest percentage decline (5.7%) being experienced by the Trenton metropolitan area. However, the Philadelphia metropolitan area had a significantly slower recovery rate, experiencing only a modest gain in 1962 and losing employment in 1963 and 1964. Despite the sizeable increase shown in 1965, and despite the gains in Bucks County which are included in the Philadelphia metropolitan area count, this metropolitan area wound up the five year period with a net decline in manufacturing employment. In addition, the non-manufacturing growth rate of Trenton, Allentown-Bethlehem-Easton, and Philadelphia metropolitan areas has lagged behind the United States for the 5 year period 1960-1965.[13] To do a meaningful job of projecting the industry employment of these four areas, given the different patterns of industry growth, would require a considerable effort which this study has not undertaken. The course chosen, supplying only U. S. projections with the discussion of the employer survey returns, was selected over the alternative of oversimplifying the matter by using United States growth rates for each of the areas.[14]

OCCUPATIONAL PATTERNS

The second important aspect of the employment-education interaction, the occupational structure of employment, is more restricted by the availability of current data. No current breakdown of occupational employment was locatable for Bucks County or any of the metropolitan areas considered in this study. This affords only the option of describing and assessing current occupational employment for the United States as a whole. Later in this report 1960 census data for Bucks County, the Philadelphia SMSA, and responses by employers to the survey questionnaire will be used in an attempt to gain a somewhat closer look at occupational patterns.

The change in employment by major occupational groups is a much talked about subject. Table IV shows some of the reasons why.

The figures point out first of all that no occupational group is expected to experience an employment decline in the 1965-1975 decade except non-farm laborers and farm employees; this follows from the expansion of industry employment examined above. Six of the occupational groups are expected to expand at a faster rate than the overall employment growth rate.

TABLE IV

(15)

Actual and Projected Employment by Major Occupation Group, 1960 to 1975

Major occupation group	Actual 1960 Number (thousands)	Actual 1960 %	Actual 1965 Number (thousands)	Actual 1965 %	Projected 1970 Number (millions)	Projected 1970 %	Projected 1975 Number (millions)	Projected 1975 %	Change, 1960-65 Number (millions)	Change, 1960-65 %	Change, 1965-75 Number (millions)	Change, 1965-75 %
Total employment	66,681	100.0	72,179	100.0	81.2	100.0	88.7	100.0	5.5	8.2	16.5	22.8
Professional, technical, and kindred workers	7,475	11.2	8,883	12.3	11.0	13.5	12.9	14.5	1.4	18.8	4.0	45.2
Managers, officials, and proprietors, except farm	7,067	10.6	7,340	10.2	8.4	10.3	9.2	10.4	.3	3.9	1.9	25.3
Clerical and kindred workers	9,783	14.7	11,166	15.5	13.1	16.1	14.6	16.5	1.4	14.1	3.4	30.8
Sales workers	4,401	6.6	4,715	6.5	5.3	6.5	5.8	6.5	.3	7.1	1.1	[illegible]
Craftsmen, foremen, and kindred workers	8,560	12.8	9,221	12.8	10.4	12.8	11.4	12.9	.7	7.7	2.2	23.6
Operatives and kindred workers	11,986	18.0	13,390	18.6	14.3	17.6	15.0	16.9	1.4	11.7	1.6	12.0
Service workers, including private household	8,349	12.5	9,342	12.9	11.4	12.7	12.6	14.2	1.0	11.9	3.2	34.5
Laborers, except farm and mine	3,665	5.5	3,688	5.1	3.7	4.6	3.7	4.2	.0	[illegible]	-.1	[illegible]
Farmers and farm managers, laborers, and foremen	5,395	8.1	4,385	6.1	3.9	4.8	3.5	3.9	-1.1	[illegible]	-.9	[illegible]

The distribution of employment among the occupational categories between 1965-1975 shows three changes. Professional, technical and relaters workers will move up from fifth largest to third largest, service workers will drop from third to fourth, and craftsmen will drop from fourth to fifth. Operatives (or semi-skilled workers) will still remain the largest occupational category followed closely by the clerical and related occupations.

This table points out a third important factor about occupational employment and that is the expansion, in number of employees, of the different major occupational groups. Here the rank order clearly changes with professional, technical and related occupations ranking first with an expected new employment expansion of 4,000,000 jobs. Clerical occupations (3,400,000) and service worker occupations (3,200,000) fall in second and third respectively. With an increase of 1,600,000 jobs the operative (or semi-skilled) occupations will rank sixth in growth of jobs. The lowest number of jobs opening during the 1965-1975 decade, excluding laborers and farm workers, will be in the sales worker occupations (1,100,000).

How accurate these projections are will remain to be seen in 1975. They are made based on an assumption of 3% unemployment and incomplete knowledge about the course of defense spending for military efforts. They do, however, provide a guideline for the probable direction and size of change in the nationwide employment of these different occupational groups. This in turn provides an intuitive sense for the expected change in occupational growth in this study area. They leave little doubt of the need to continue advancing all elements of post high school education.

INDUSTRY-OCCUPATION STRUCTURE

For this third dimension in the relationship between employment and education we focus on the interrelationship between industry type and occupation. The interest here is to explain the impact of an area's industrial mix on the distribution of occupational opportunities. This serves as an estimate of the occupational structure toward which an educational system might gear itself either through instruction, career counseling, or both.

Since there are no available figures for 1966, the 1960 Census of Population provides the closest approximation.[16] We will have to assume that the internal occupation structure of an industry sector has not changed so radically during this six year period as to critically affect the usefulness of 1960 data. Furthermore, since the 1960 Census of Population is a census of people rather than industry establishments the pictures represented in the tables below will not reflect employment of industry establishments within a jurisdiction or SMSA (although they should be fairly decent approximations) but rather the employment of people who live in the SMSA or Bucks County. The approximation to employment by establishment will be closer for the SMSA than for Bucks County due to the larger out migration factor. Using the industry-occupation matrix of the 1960 Census we should have a sharper focus on their implications for post high school education.

From the occupational side of the matrix there stands out some clear patterns which revolve around the dominant role of manufacturing industry in the region's economy. For each occupation, Table V summarizes the industry type in which the occupational group occurs most frequently and second most frequently.

Table V

Predominant Industry Type by Occupation - Philadelphia SMSA, 1960[17]

Occupation	Predominant Industry Type	% of Occup.	Secondary Industry Type	% of Occup.
Professional, technical, related	Manufacturing	28.1%	Service	25.4%
Manager, official, proprietors	Retail trade	29.2%	Manufacturing	21.7%
Clercial and Kindred	Manufacturing	29.8%	Fin.-Ins.-Real Est.	13.7%
Sales Workers	Retail trade	54.9%	Manufacturing	16.8%
Craftsmen, foremen	Manufacturing	50.6%	Construction	18.8%
Operatives	Manufacturing	71.4%	Transportation	8.0%
Service Workers	Services	41.4%	Retail trade	24.5%
Laborers	Manufacturing	31.4%	Construction	18.8%

Essentially, this frequency of occupations across all industry types is a reflection of the concentration of certain industries. In the Philadelphia SMSA, the dominant impact of manufacturing industries is obvious, having the greatest employment in 5 out of 8 occupational categories and second highest in 2 out of the remaining 3. Within manufacturing industry, employment is divided approximately 60-40 between durable and non-durable goods producing industries, respectively. Once employment in manufacturing industries is accounted for, the occupational distribution is more scattered and reflects not only the size of employment for any particular industry, but also the nature of the work force in the industry itself.

This factor can be more clearly seen if we look at the industry side of the matrix. For each industry, the occupation category which occur most frequently and second most frequently is shown in Table VI.

TABLE VI. Predominant Occupation by Industry Type

Philadelphia SMSA, 1960[18]

Industry	Predominant Occupation	% of Indus.	Secondary Occupation	% of Indus.
Agriculture	Laborers	47.6%	Mang'rs., off'ls, prop.	39.8%
Mining	Operatives	39.1%	Craftsmen, fore.	23.1%
Construction	Craftsmen, fore.	54.6%	Laborers	16.8%
Manufacturing	Operatives	40.4%	Craftsmen, fore.	20.7%
Transportation	Operatives	39.8%	Clerical, related	20.5%
Communications	Clerical, related	54.0%	Craftsmen, fore.	26.9%
Utilities	Craftsmem, fore.	33.9%	Clerical, related	18.8%
Wholesale trade	Sales workers	25.1%	Clerical, related	23.5%
Retail trade	Sales workers	29.1%	Service workers	18.3%
Fin.-Ins.-R.E.	Clerical, related	49.7%	Sales workers	20.6%
Service	Service workers	34.6%	Prof. and tech.	23.6%
Medical Services	Prof. and tech.	48.9%	Service workers	27.8%
Education (public)	Prof. and tech.	69.5%	Service workers	16.1%
Public Admin.	Clerical, related	46.2%	Service workers	19.7%

In all but four industry types the two most frequent occupations account for 60% of the employment or greater. Three of the four remaining industry types are service oriented industries (wholesale trade, retail trade, and service industries) which have substantial employment scattered in several occupational categories. As might have been expected, the medical services and education (public) service industries were the only two industry types with a predominant proportion of professional, technical, and related employment.

One final piece of information is useful in an examination of the occupation-industry relationship. The intervening role of "male-female" on the distribution of occupation by industry type narrows down more closely the impact of industry types on the range of occupational choices. The distributions are sufficiently different to be examined separately.

TABLE VII Predominant Occupation by Sex by Industry Type[19]

Industry Type	% Male	% Female	Predominant Male Occupation	% Within Industry Type	Predominant Female Occupation	% Within Industry Type
Agriculture	88.6	11.4	Laborers	48.1	Clerical and Kindred	43.8
Mining	88.6	11.4	Operatives	43.1	Clerical and Kindred	80.5
Construction	95.8	4.2	Craftsmen, fore.	56.7	Clerical and Kindred	77.2
Manufacturing	73.5	26.5	Operatives	34.3	Operatives	57.4
Transportation	91.0	9.0	Operatives	43.7	Clerical and Kindred	79.0
Communications	45.4	54.6	Craftsmen, fore.	57.8	Clerical and Kindred	91.2
Utilities	89.1	10.9	Craftsmen, fore.	37.6	Clerical and Kindred	81.5
Wholesale Trade	80.2	19.8	Salesworkers	30.0	Sales Workers	73.9
Retail Trade	59.8	40.2	Sales Workers	24.1	Sales Workers	36.6
Fin.-Ins.-Real Estate	54.9	45.1	Sales Workers	34.3	Clerical and Kindred	83.6
Services	49.5	50.5	Prof.,tech.,related	30.6	Service Workers	50.3
Medical Services	33.4	66.6	Prof.,tech.,related	57.8	Prof.,tech.,related	44.4
Education (public)	34.6	65.4	Prof.,tech.,related	68.7	Prof.,tech.,related	70.0
Public Administration	73.0	27.0	Clerical and Kindred	35.6	Clerical and Kindred	75.0

Eight of the fourteen industry types are overwhelmingly employers of male personnel. Two other industry types employ a majority of male personnel. Only four industries employ a majority of female personnel and these are all service related industries. For male employment the occupation distribution is a duplicate of the distribution in Table VI with the exception of occupations in the communications, finance-insurance-real estate, and service industries where the predominant occupation is directly related to high female employment. Where female employment differs from the predominant occupation shown in Table VII it is exclusively a change to clerical and kindred employment.

As we turn to Bucks County and examine the industry-occupation structures of its employed residents the subject of regional interaction clearly emerges. According to the recent report by the Regional Science Research Institute on interdependence in the Penjerdel region over 40,000 employed residents (approximately 44%) commute to jobs outside of the County, primarily to jurisdictions within the Philadelphia metropolitan area and to a smaller extent to the Trenton metropolitan area.[20] It is in this context that the data presented above on the Philadelphia metropolitan area is of such importance.

For Bucks County alone there are no figures in comparable detail to those reported for the Philadelphia SMSA. It is possible, however, to show how Bucks County residents differ from their neighbors in the metropolitan area given knowledge of the total employment of the residents by industry type and occupational categories. This data is available from the 1960 Census of Population. The marginal totals are shown in Table VIII as well as the deficit or surplus for Bucks County residents relative to how they would distribute themselves if they were like the metropolitan area as a whole.

Table VIII

Differences in Occupational Distribution in Philadelphia SMSA and Bucks County[21]

Occupation Group	Expected Bucks County	Actual Bucks County	Percent	Difference
Professional, technical, related	13,009	14,350	13.0	+ 1,341
Manager, official, proprietor	8,996	10,084	9.2	+ 1,088
Clerical and Kindred	18,643	14,743	13.4	- 3,900
Sales Workers	8,356	8,400	7.6	+ 44
Craftsmen, Foremen	16,096	20,687	18.8	+ 4,591
Operatives	22,270	23,743	21.5	+ 1,473
Service Workers	11,763	7,671	7.0	- 4,092
Laborers	4,972	5,716	5.2	+ 744
Not reported	5,920	4,855	4.4	- 1,065
	110,025	110,249	100.1	

Source: Table 84, PC(1)-40C, Census of Population-1960, Bureau of the Census.

As the table indicates, Bucks County residents show some marked differences in occupation distribution from what would occur if they were employed in the same proportions by occupation and industry type as all residents of the Philadelphia SMSA. Both the service related occupations and clerical and related occupations are below what would be expected while employment in craftsmen-foremen and professional-technical occupations is greater than would be expected. This reflects in part the lower employment in the retail trade, service, and food producing and at the same time a higher employment in primary metal, construction, and technically oriented manufacturing industries, as shown partly in Table IX.

Table IX

Percent Employed in Manufacturing Industries in the Philadelphia SMSA and Bucks County, 1962[22]

Industry Category	Bucks County	Philadelphia SMSA
Furniture, lumber, wood	1.7%	1.7%
Primary ferrous metals	20.2%	4.9%
Primary non-ferrous metals	.5%	.9%
Fabricated metals	5.6%	8.8%
Machinery, excluding electrical	5.4%	8.3%
Electrical machinery	5.8%	11.5%
Motor vehicles	3.0%	2.2%
Aircraft and parts	3.6%	.7%
Other transportation	.2%	3.9%
Other durables	12.4%	6.5%
Food and kindred	3.8%	9.0%
Textile mill products	5.0%	5.4%
Apparel and other textiles	9.9%	9.3%
Printing, publishing, etc.	8.3%	7.3%
Chemicals	10.9%	6.8%
Rubber and Plastics	3.0%	2.2%
Other non-durables	.6%	9.7%
	99.9%	99.1%

Without the full matrix for occupation-industry relationships in Bucks County it is difficult to pin down any closer the employment market. From the metropolitan area standpoint the figures in Table X point clearly to large employment in such occupations as assemblers, truck drivers, welders, sewer and stitcher checkers, carpenters, foremen, machinists, mechanics, plumbers, printing craftsmen, shipping and receiving clerks, secretaries, bookkeepers, salesworkers, and the more scientifically related professional and technical occupations. From the industry standpoint there is no question both in Bucks County and in the Philadelphia SMSA of the important contribution to employment made by a wide variety of manufacturing and retail trade establishments. If Bucks County is to satisfy a broad range of this job market then the job for post high school education will necessarily involve extending vocational and technical training beyond high school in conjunction with expanding the college degree programs. It is in this light that we can turn to the question of the relation between employment and educational attainment.

Table X

Employment by Selected Occupations for the Philadelphia SMSA, 1960[23]

Occupation	Employment in SMSA
Accountants and Auditors	14,038
Chemists and natural scientists	4,825
Designers and draftsmen	11,174
Engineers	21,000 +
Technicians	17,100 +
Other professional, technical, etc. (educ., med., govt.)	108,905
Managers and proprietors (self employed)	50,645
Bookkeepers	20,492
Cashiers	12,165
Shipping Clerks	10,657
Stock Clerks	7,968
Office machine operators	7,547
Secretaries	43,644
Stenographers	6,056
Telephone operators	9,906
Typists	18,555
Sales Workers	112,000 +
Cabinetmakers	3,216
Carpenters	14,636
Cranemen	3,940
Electricians	9,827
Foremen	33,542
Machinists and jobsetters	17,933
Mechanics and repairmen	55,102
Plumbers and pipefitters	10,933
Printing craftsmen	11,870
Stationary Engineers	8,918
Toolmakers, die makers, etc.	5,445
Assemblers	13,959
Checkers, examiners, etc.	6,489
Power machine operators, stitchers, etc.	20,351
Truck drivers and deliverymen	47,383
Welders	11,621
Janitors and porters	22,199
Guards, watchmen, doormen	8,320
laborers	70,743

OCCUPATIONS AND EDUCATIONAL ATTAINMENT

The third dimension of the relationship between employment and education is brought into focus by Tables XI and XII describing educational attainment of the labor force by major occupational groups in the United States.

Although the figures themselves indicate an apparent slow change in the educational attainment of each occupational group considered separately, where the overall attainment of the labor force is considered the gap is fairly large. This can also be seen in the educational attainment of different age groups over time. Table XII shows the median educational gap of over two years formal education between the civilian labor force age 55 to to 64 and that age 18 to 24.

If Table XI is compared with the expected 1975 employment by occupational groups - as shown in Table XIII - there is again a very clear indication that all forms of post high school education have a major task ahead to accommodate the employer demands on education.

TABLE XI

(24)

Median Years of School Completed by the Employed Civilian Labor Force 18 Years and Over, by Sex, Occupation Group, and Color, Selected Dates, 1948–66

Occupation Group	Total							
	March 1966	March 1965	March 1964	March 1962	March 1960	March 1957	October 1952	October 1948
All occupation groups	12.3	12.2	12.2	12.1	12.0	11.7	10.9	10.6
Professional and managerial workers	14.6	14.2	14.0	12.9	12.5	12.2	12.9	12.8
Professional, technical, and kindred workers	16.3	16.3	16.2	16.2	16.2	16+	16+	16+
Managers, officials, and proprietors, exc. farm	12.6	12.6	12.6	12.6	12.4	12.4	12.2	12.2
Farmers and farm managers, laborers, and foremen	8.8	8.7	8.7	8.7	8.6	8.5	8.3	8.0
Farmers and farm managers	8.9	8.8	8.8	8.8	8.7	8.6	8.5	8.2
Farm laborers and foremen	8.5	8.4	8.0	8.5	8.3	8.2	7.6	7.6
Clerical and sales workers	12.5	12.5	12.5	12.5	12.5	12.4	12.4	12.4
Clerical and kindred workers	12.5	12.5	12.5	12.5	12.5	12.5	12.5	(3)
Sales workers	12.5	12.5	12.5	12.5	12.4	12.4	12.3	(3)
Craftsmen, operatives, and laborers, exc. farm and mine	11.0	10.8	10.7	10.6	10.0	9.7	9.3	9.0
Craftsmen, foremen, and kindred workers	11.9	11.7	11.5	11.2	11.0	10.5	10.1	9.7
Operatives and kindred workers	10.7	10.6	10.5	10.1	9.9	9.5	9.1	9.1
Laborers, exc. farm and mine	9.5	9.5	9.3	8.9	8.6	8.6	8.3	8.0
Service workers, including private household	10.9	10.8	10.5	10.2	9.7	9.0	8.8	8.7
Private household workers	9.0	8.9	8.8	8.7	8.4	8.3	8.1	(3)
Other service workers	11.4	11.3	11.0	10.8	10.3	9.6	9.2	(3)

TABLE XII

(25)

Median Years of School Completed by the Civilian Labor Force 18 Years and Over, by Age, Selected Dates, 1952–66

	18 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 years and over
October 1952	12.3	12.1	11.4	8.8		8.3
March 1957	12.3	12.2	12.0	9.5		8.5
March 1959	12.3	12.3	12.1	10.8	8.9	8.6
March 1962	12.4	12.4	12.2	11.6	9.4	8.8
March 1964	12.4	12.4	12.2	12.0	10.0	8.9
March 1965	12.4	12.5	12.3	12.0	10.3	8.9
March 1966	12.5	12.5	12.3	12.1	10.4	9.1

TABLE XIII

Comparison of U. S. Median Educational Achievement with Job Growth, by Occupation Group - 1966[26]

	Median Educational Achievement 1966	Growth In Jobs Between 1965-1975
Professional, technical and related	16.3	4,000,000
Managers, officials, and proprietors	12.6	1,900,000
Clerical and related workers	12.5	3,400,000
Sales Workers	12.5	1,100,000
Craftsmen, foremen, and related	11.9	2,200,000
Operatives	10.7	1,600,000
Service workers	10.9	3,200,000
Laborers, except farm	9.5	- 100,000
Farm managers, laborers, and foremen	8.8	- 800,000

We began this report missing a very desirable link in the employment - education relationship; the occupational structure of major industry groups for Bucks County. There was also missing for the three metropolitan areas and Bucks County any current data on employment by occupational group and educational attainment of the labor force. This information is clearly needed to properly assess the impact of employment trends on the educational system. It seems at a minimum that the State of Pennsylvania should collect and publish information on occupations at the same time they collect employment by industry which would afford an opportunity to more closely examine the relationship between education, occupation, and employment.

Despite these shortcomings the picture can be generalized for the United States, as one of major growth in almost all industry divisions but most of all in the wholesale and retail trade, service and government industries. Manufacturing (particularly the durable goods sector) will also experience a substantial growth but fewer new jobs will open in this industry division than in the former three. Almost all occupation groups will follow with substantial growth, the exceptions being laborers and farm related occupations. Particularly high growth is expected in the professional and technical, service worker, and clerical occupations. Educational attainment should continue to increase with over 10,000,000 of the 17,400,000 new jobs being in occupations which have a median educational attainment beyond high school.

BUCKS COUNTY'S LARGE EMPLOYERS

The survey of employers in Bucks County was designed to provide information about the larger employers in the County; particularly, their occupational structure, occupational-education attainment patterns, their extent of support for off-the-job education, their consideration as an education resource, and their needs for different occupational skills.

From secondary sources cited earlier in the report it was possible to sketch in the industry structure in Bucks County which showed the predominant position of manufacturing industries in the County's employment market. Between 1960 and 1965 manufacturing industry employment grew at the rate of 1.6%, 6.15%, 5.0%, 8.6%, and 7.2%. In 1965 all non-manufacturing industries, of which there were over 4,300, accounted for approximately 30% of the total employment in Bucks County.

Secondary sources also provide a census year distribution of occupational employment which, however unsatisfactory in terms of being dated, can provide a picture of the occupational employment of Bucks County residents in 1960 and be compared with that of the United States for the same year (see Table XIVO.

TABLE XIV

Distribution of Employment by Occupation Group, 1960 - Bucks County and United States[27]

	% Distribution Bucks County 1960	% Distribution United States 1960
Professional and Tech.	13.0	11.2
Managers & Proprietors	7.9	10.6
Clerical and Related	13.4	14.7
Sales Workers	7.6	6.6
Craftsmen, foremen & related	18.8	12.8
Operatives and related	21.5	18.0
Service Workers	6.9	12.5
Laborers, except farm	4.2	5.5
Farm managers, laborers, and foremen	6.7	8.1

Again, the large concentration of bucks County employment in the craftsmen and operative occupations can reasonable be interpreted as following from growth in the construction industry as well as growth in the primary metals manufacturing industry. The professional and technical employment has its most likely origins in growth of the government division (particularly in the field of education) and the chemical, instrumentation, and primary metal industries.

The Bucks County employer survey provides a more detailed look at the occupational skills employed by larger employers; although, as mentioned earlier the pattern is distorted by the lack of response from non-manufacturing industries.

TABLE XV

Bucks County Large Employers Current Employment by Occupation Group

Employment Classification	Bucks County Current Employment*	Projected Employment May 1968*
Unskilled	2,564	2,683
Semi-skilled	8,890	9,224
Skilled	6,943	7,161
Sales	602	648
Service	1,222	1,259
Clerical	3,247	3,386
Administrative	616	686
managerial	1,525	1,506
Semi-professional	1,526	1,603

professional	4,632	4,754

*Of those responding to questionnaire.

The pattern of employment shown in Table XV above is more easily connected to educational demand when employer responses to desired educational attainment by employment classification are considered, as shown in Table XVI.

Table XVI

ESTIMATED MINIMUM EDUCATION NEEDED

(Employer Respondents to Questionnaire)

Employment Classification	Less than High School (1)	High School Graduate (2)	Voc. or Tech. Training After High School (3)	Business or Commercial Training After High School (4)	Some College but less than 2 years (5)	2 or more years of College but less than 4 (6)	College Graduate or more (7)
a. Unskilled	27	5					
b. Semi-skilled	12	21	1				
c. Skilled	1	14	17				
d. Service	5	16	3	1			
e. Sales		5	3	2	2	3	6
f. Clerical		23	2	9	1		
g. Administrative		1		4	4	13	8
h. Managerial		2		1	6	5	15
i. Semi-professional			5		3	9	5
j. Professional							25

The larger employers in Bucks County still feel generally that persons with less than high school graduation can be hired in unskilled jobs. One third still hold this view in terms of the semi-skilled workers while the larger number shift the minimum to high school completion and a few feel that vocational and technical education beyond high school is necessary. Skilled employment very definitely requires high school graduation with a majority of employers placing the minimum at vocational or technical education after high school. Employment in the service occupations was generally recognized as requiring high school completion.

Employers exhibited the widest difference over the educational background required for sales employment, ranging in their opinions from high school completion through completion of college. These responses correlated highly with the industry type, the more technically oriented industries requiring a higher minimum education.

Two-thirds of the employers feel high school graduation is sufficient education for clerical employment. The remaining one-third feel some education after high school is required.

Education beyond high school is clearly a minimum requirement for the administrative, managerial, semi-professional, and professional level occupations. The majority of employers feel some college education but less than a college degree would satisfy the educational requirements for administrative occupations. The reverse was true for managerial. There was complete agreement on the requirement of a college degree for professional employment. Only two employers felt a college degree was necessary for semi-professional employment and the remainder were divided between the requirement of two or more years of college and vocational or technical training after high school. When these estimates are placed alongside the projected employment of those responding to the questionnaire the task of post high school education in the future is quite large.

TABLE XVII

Comparisons of Educational Requirements with '68 Employment, by Occupation Group - Bucks County Large Employers

	Bucks County Projected Employment-1968*	Estimated Educational Requirement
Unskilled	2,683	Less than 12 yrs.
Semi-skilled	9,224	12 yrs.
Skilled	7,161	12+ yrs.
Service	648	12 yrs.
Sales	1,259	12-16 yrs.
Clerical	3,386	12+ yrs.
Administrative	686	12-16 yrs.
Managerial	1,506	12-16 yrs.
Semi-professional	1,603	12-16 yrs.
Professional	4,754	16 yrs.

*of those responding to questionnaire.

The actual hiring pattern of these same employers bears out to a large extent this estimate of minimum educational requirements. Twenty eight of the employers reported the extent of their hiring during 1966 by the same occupational classes.

The number hired and the percentage with different educational backgrounds are shown in Tables XVIII and XIX (these figures include replacements).

TABLE XVIII

New Employees,* by Occupation Group, 1966

Occupational Class	Number Hired During 1966*
Unskilled	1,407
Semiskilled	1,409
Skilled	781
Service	68
Sales	212
Clerical	727
Administrative	117
Managerial	154
Semi-professional	348
Professional	544
	5,767

TABLE XIX

Educational Attainment of New Employees, 1966*

	Number	Percent
With less than high school	926	16.06
With high school diploma	2,954	51.22
With voc. or tech. training after high school	480	8.32
With Bus.-Commer. training after high school	186	3.23
With some college but less than 2 years	250	4.33
With 2 or more years of college but less than 4	268	4.65
With college degree or more	703	12.19
Total hired during 1966	5,767	100.0

*Hired by Employer respondents to Questionnaire

Employers included in the survey were also asked to provide the number of weeks and number of participants in company education and training programs. Twenty-three employers responded with estimates of the number of participants and length of education and training programs provided by the company. The most commonly sponsored programs were those for new employees, lasting on the average one to two weeks. What they amounted to basically were orientation programs for new employees rather than programs of the "trainee" type which might extend over several months to more than one year. Employers provided a total of 276 weeks of this type of training to 1046 participants.

Company-provided refresher courses, which were not involved with immediate job advancement, involved a greater number of participants (1616) but much smaller effort in terms of weeks spent on such training (59 weeks). As might be expected, these programs were oriented largely to the professional employees who accounted for over 38% of the participants. The programs were also of short duration, lasting between one and two weeks on the average.

Training for new production or manufacturing methods and job advancement training ranked third and fourth respectively with 874 and 375 participants.

These responses parallel the general pattern in industry except for those firms with substantially large employment.

Employers provide a relatively small amount of organized, formal instructional programs. Their needs continue to be met primarily through informal, on-the-job training or educational programs outside the company.

Other responses on the questionnaire were also designed to provide a characterization of the education-employment interaction. Employers were asked to indicate the statement which most nearly represented their company's viewpoint on the development and usefulness of public education and training programs as a substitute for those now conducted by the company or as a help to industries who do not now provide company education or training programs. Six felt their needs were too specialized and would not consider using such programs, 6 felt the programs could be developed but would not use them, and 24 responded that the programs could be developed and they would consider making use of them. This response suggests that public education institutions can assist employers by providing continuing education of employees after hiring. The potential is clearly indicated by the Bucks County Industrial Development Corporation program for the training of unemployed persons in manufacturing industries in Bucks County.

Employers were also asked to what extent, if at all, they provide support for off-the-job training or education of their employees. Twenty-eight of the employers responded positively that they do provide tuition refund (18 refund more than 1/2) for employees wishing to continue their education outside the company but 24 responded that such educational pursuits would have to be job related, 23 responded that no time off was allowed with pay, and 10 restricted this benefit to professional and managerial employees.

As a last question, employers were asked to indicate what three occupational skills would be most needed by them over the next five years in the order of their importance. Not surprisingly the results bear a strong relationship to the employers' expected new employment for the year 1968. In the order of their need, professional, skilled, and semi-skilled occupations ranked the highest.

PROFESSIONAL EMPLOYMENT IN EDUCATION

It seems appropriate to close this section with a closer examination of one of the larger occupational demands in the County - professional education employment.

Bucks County's larger employers responding to the survey reported 4,583 professional employees. Over one-half of this professional employment was reported by school districts, with teachers accounting for the majority of professional employment in the school districts.

Over the past several years the unmet demand for teachers has become a national concern. Projections of requirements for relieving the teacher shortage during 1965 and 1966 turned out to be underestimates due to higher enrollment than expected, demands for teachers to implement school improvement programs under the Elementary and Secondary Education Act of 1965, and a decline in the proportion of college graduates in teacher education curricula who actually entered teaching as a profession.

Of all the professions, teaching is the largest with over 2 million men and women employed as full time teachers in 1965. To staff the school classrooms across the country by 1975 an additional 650,000 teachers will be required, and between now and 1975 approximately 1 1/2 million teachers will be needed to replace those who leave the school systems due to retirement, death, or other reasons.

In 1964 all the school districts combined in Bucks County employed 3,480 teachers. In 1966 the total for all 13 school districts reached 3,962. Thus, in addition to filling 482 new positions the school districts have had to hire approximately 700 teachers to replace the 10% to 15% annual turnover of employees. The seven school districts in Bucks County with over 200 employees responding to the survey reported current professional employment of 2,651 with 20 positions currently unfilled. During 1966 they hired 256 professional employees to fill newly established positions and to replace those leaving employment with the school districts. They expect professional employment to increase by 67 new positions or 3% by May, 1968.

As suppliers of teacher training to improve teacher skills, these seven school districts reported supporting programs ranging from none at all, to approximately 1-1/2 weeks in-service training for all teachers. Although this relatively small amount of teacher training provided by the school districts themselves could indicate a policy of relying on facilities outside the school system to provide the resources for continued education and training of their professional employees, the financial support provided by school districts is small. Three school districts provide no tuition refund for teachers seeking to continue their education, two school districts provide less than one-half (in one case only the purchase of books is covered), and two school districts provide a tuition refund of greater than one-half the cost.

On the other hand, four of the seven school districts felt that public education and training programs in their geographic area could be developed to support the needed teacher training programs and they would consider using them. The three remaining school districts either considered their training needs too specialized or the question not applicable.

When asked what type of educational or training programs would be most helpful to the school districts, six out of the seven indicated college credit programs for degree and non-degree work as most helpful. Other types of programs were also indicated as helpful which were more closely related to other employment categories in the school district.

When these responses are considered together it seems apparent that the larger school districts, although they employ over one-half the professional employment of employers responding to the survey, do not serve as an educational resource to any large extent for their professional employees nor do they in any substantial way support the cost of these employees pursuing further education and training. Although they seem to agree on the general type of educational programs which are needed to advance the skills of their professional employees they do not agree on the methods for securing this education and training.

With the changes occuring in content, methods, and techniques of teaching it seems probable that training and retraining of teachers will need to be undertaken to continue the advance of Bucks County's educational system. If such a need is confirmed by those responsible for educational employment in Bucks County then provisions will need to be made either for more extensive training programs in the school system or educational programs through outside institutions, whichever proves to provide the more satisfactory arrangement.

CONCLUSIONS

There is expected in the 1965-1975 decade a period of sustained growth in the United States. Although more demand will be generated for employment in some industry divisions than others none are expected to decline except agriculture. The heaviest demand is expected in service producing industries, primarily government and the retail trade. All occupations except laborers and farm related occupations are expected to show high gains with the largest increases expected in the professional and technical, clerical, and service workers occupations. Educational attainment of the labor force should continue to rise with the younger age labor force establishing a pattern of higher educational attainment than the older age segment of the labor force. In terms of entrance level employment this most likely means that the median educational attainment of the labor force will be the entrance requirement.

The three metropolitan areas surrounding Bucks County we assume will react largely along the same pattern as the United States as a whole. If the United States sustains the expected period of growth then each of the metropolitan areas will also experience a share of this expansion although perhaps not at as a great a pace.

Bucks County itself has experienced a substantial period of employment growth over the past decade providing verification of the well noted process of industry establishment in the suburban areas. Even if employment expands only at the rate expected for the United States as a whole this would generate a demand of over 2,000 jobs each year in Bucks County. The impact of this expansion on the educational system will be directed at all dimensions of post high school education from continuing education through vocational, technical, and college level work. There is no one institution which will suffice for all the training needed to satisfy the employment demands of the larger employers of Bucks County.

Bucks County's larger employers will not play a particularly large role as an educational resource in the sense of formal, instructional education (one major exception being the communications industry). This is generally the common pattern across the United States until industries reach a very substantial size. However, the majority of these employers have indicated that the education and training programs they now, or will need to, provide could be undertaken by the public educational institutions and that they would be willing to consider using them. Short of this occuring there will continue to be a fair amount of on-the-job training which employers do provide to improve the skill and productive efforts of their own employees. There is no indication that they expect to perform on any large scale the formal, instructional education normally expected from the educational institutions.

FOOTNOTES

1. U. S. Department of Labor, Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization, and Training, Washington, D. C.: Government Printing Office, April 1967, p. 274.

2. See "Health Manpower", Employment Service Review, November, 1966.

3. Ibid., p. 274.

4. Commonwealth of Pennsylvania, State Employment Service of Pennsylvania (Philadelphia), Reprinted Tables, "Total Civilian Work Force, Unemployment and Employment by Industry: Annual Averages, 1960-1965 Philadelphia Labor Market Area, Table 1, 1966.

5. Commonwealth of Pennsylvania, State Employment Service of Pennsylvania (Allentown-Bethlehem-Easton), Reprinted Tables, "Total Civilian Work Force, Unemployment and Employment by Industry: Annual Averages, 1950-1965, Allentown-Bethlehem-Easton Labor Market Area", Table 1, 1966.

6. U. S. Department of Commerce, Bureau of Census, Pennsylvania County Business Patterns, Table 2 (November 1966), pp. 44-48.

7. U. S. Bureau of Labor Statistics, Employment and Earnings Statistics for States and Areas, 1939-1965, Bulletin No. 1370-3 (June 1966), pp. 422-424.

8. U. S. Department of Labor, Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization, and Training, Table C-2, "Total Employment on Payrolls of Manufacturing Industries: Annual Averages, 1947-1965", March 1966, p. 199.

9. Commonwealth of Pennsylvania, State Employment Service of Pennsylvania (Philadelphia), "Total Manufacturing Wage and Salary Employment in Philadelphia's Labor Market Area, by Industry Annual Averages 1950-1959", Table 2, 1966.

10. Commonwealth of Pennsylvania, State Employment Service of Pennsylvania (Allentown-Bethlehem-Easton), Reprinted Tables, "Total Manufacturing Wage and Salary Employment by Industry, 1950-1965: Allentown-Bethlehem-Easton", Table 2, 1966.

11-A Commonwealth of Pennsylvania, Department of Internal Affairs, Bureau of Statistics, 1964 Statistics by Major Industry Group for Counties and Urban Places, "Statistics for Manufacturing Industries by Major Industry Group - Bucks County 1963", Harrisburg, November 1964 p. 12.

11-B Commonwealth of Pennsylvania, Department of Internal Affairs, Bureau of Statistics, 1964 Statistics by Major Industry Group Bucks County, 1964, Harrisburg, December 1965, p. 14.

11-C Commonwealth of Pennsylvania, Department of Internal Affairs, Bureau of Statistics, Employment by Broad Industry Groups and by County for Selected Years: 1919-1961, Harrisburg, 1966: Tables 5 through 10, "Number of Employees in Pennsylvania Industries, by County: 1956-1961", pp. 17-34.

12. U. S. Bureau of Labor Statistics, Employment and Earnings Statistics for States and Areas 1939-1965, Bulletin No. 1370-3, June 1966, pp.422-424.

13-A U. S. Department of Labor, Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization and Training, Table C-1, "Total Employment on Payrolls of Non-Agriculture Establishments, by Industry Division: Annual Averages, 1947-1965", March 1966, p. 198.

13-B U. S. Bureau of Labor Statistics, Employment and Earning Statistics for States and Areas, 1939-1965, Bulletin No. 1370-3 (June 1966), pp. 422-424. 564-567, 576-580.

14. See Battele Memorial Institute, The Michigan Manpower Study, Columbus, Ohio: Battele Memorial Institute, November 1966 and also Leslie Fishman, William Roberts, Charles Franks and William McCormick, Methodology for Proportions of Occupational Trends in the Denver Standard Metropolitan Statistical Area, Boulder, Colorado: University of Colorado, Institute of Behavioral Science, March 1966.

15. U. S. Department of Labor, Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization, and Training, Table E-8, "Actual and Projected Employment by Major Occupation Group, 1960 to 1975", April 1967, p. 274.

16. U. S. Department of Commerce, Bureau of the Census, U. S. Census of the Population: 1960 - Pennsylvania, PC(1)-40D, Washington, D. C.: U. S. Government Printing Office, pp. 863-868.

17. Ibid., p. 863-868.

18. Ibid., p. 863-868.

19. Ibid., p. 863-868.

20. Regional Science Research Institute, Interdependence in Penjerdel Region, Philadelphia, Pennsylvania, November 1967, p. 15.

21. Bureau of the Census, PC(1)-40C op. cit., 863-868 U. S. Department of Commerce, Bureau of the Census, U.S. Census of the Population: 1960 Pennsylvania, PC(1)-40C, Washington, D. C.: U. S. Government Printing Office, pp. 487-495.

22. Department of Internal Affairs, Bureau of Statistics, 1962 County Industry Report: Philadelphia, November 1963 and Department of Internal Affairs, Bureau of Statistics, 1962 County Industry Report: Bucks County, November 1962.

23. U. S. Department of Commerce, Bureau of the Census, U. S. Census of The Population: 1960 - Pennsylvania, PC(1) 40D, Washington, D. C.: U. S. Government Printing Office, pp. 863-868.

24. U. S. Department of Labor, *Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization and Training*, April 1967, *supra*, p. 240.

25. *Ibid.*, p. 239.

26. *Ibid.*, pp. 240, 274.

27. *Ibid.*, p. 274 and also U. S. Department of Commerce, Bureau of the Census, U. S. Census of Population: 1960 -- Pennsylvania, PC (1)-40C, Washington, D. C.: U. S. Government Printing Office, p. 488.

APPENDIX A

List of Employer Respondents

AMPCO, P.B. & B. Division
Badenhausen Corporation
Bell Telephone
Bucks County Government
Carlton Plastics, Inc.
Central Bucks County School District
Council Rock School District
Delbar Products, Inc.
Eastern Rotorcraft
Eastern State School's Hospital
Edgecomb Steel Company
Fischer & Porter Company
Food Fair Stores
Forest Products Division, Owens-Illinois, Inc.
Giles & Ransome, Inc.
Harvey Clothing Company
Hurst-Campbell, Inc.
Minnesota Mining & Manufacturing
Mohawk Devices, Inc.
Naval Air Development Center
Paramount Packaging Corporation
Patterson Parchment Company
Pennridge School District
Pennsalt Chemicals Corporation
Pennsbury School District
Perkasie Industries Corporation
Purex Corporation, Ltd.
Quakertown Community School District
Rohm & Haas Company
Royal Pants Manufacturing Company
School District of Bensalem
School District of Bristol Township
Schutte & Koerting Company
Strick Trailer Corporation
Sylvan Pools, Inc.
Thiokol Chemical Corporation
U. S. Gauge, Division of AMATEK
U. S. Steel, Fairless Works
Vector Division of United Aircraft Corporation